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Assessment of E-Waste Workers Knowledge Levels Regarding Potential Health Risks Associated With Electronic Waste In Ladipo Market, Lagos State, Nigeria

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Abstract

The growing challenge of electronic waste (E-waste) management, particularly in developing countries like Nigeria, has become a significant environmental and public health concern. This study assessed the knowledge levels and practices of e-waste workers regarding health risks associated with e-waste in Ladipo Market, Lagos State, Nigeria. Using a descriptive cross-sectional design, 96 e-waste workers, including repairers, recyclers, and waste scavengers, were surveyed through structured questionnaires. Socio-economic characteristics, awareness levels, and work practices were analyzed using frequencies, percentages, and correlation techniques. Results indicate a significant knowledge gap, with only 35% of respondents aware of long-term health risks such as respiratory issues and toxic metal exposure. Despite this, 85% of participants reported engaging in informal disposal methods, including open burning and improper handling. which contribute to environmental degradation and public health risks. Correlation analysis revealed a strong positive relationship ($r = 0.72$) between knowledge levels and the adoption of safety measures, emphasizing the role of education in promoting safer practices. Furthermore, workers with higher education levels demonstrated better adherence to safety measures. This study highlights the urgent need for structured interventions, including targeted educational programs and policy-driven regulatory frameworks, to improve awareness and promote sustainable e-waste management practices. Recommendations include enforcing stricter environmental laws, establishing formal recycling systems, and creating community awareness campaigns to mitigate the health and environmental risks associated with e-waste.

Keywords: Electronic Waste (E-waste), E-waste Management, Health Risks, Ladipo Market, Sustainable Practices.

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1. Introduction

There is an unheard-of increase in electronic waste in Sub-Saharan Africa and Nigeria because more people are using electronics. This puts public health and the environment at serious risk and needs to be fixed right away. Cell phones, laptops, home gadgets, and industrial electronics are all types of electronic waste (Baldé et al., 2017; Forti et al., 2020). People moving into cities, the growth of the digital economy, and how easy it is to get technology have all sped up the use and dumping of electronics. Rich countries are also throwing their electronic garbage into Sub-Saharan Africa at the same time (Amankwaa, 2013; Mereki et al., 2016). Grant et al. (2013) and Tsydenova and Bengtsson (2011) say that when electronics are no longer needed, they could release harmful chemicals into the environment if they are thrown away improperly or recycled illegally. This puts people and natural groups in danger in different ways. People who work in the informal recycling industry, children, and women who are pregnant are most likely to be affected by the health risks that build up over time. To get a full picture of these health risks, there is need to look at the demographics of Sub-Saharan Africa, how it affects people, and how they are exposed (Caravanos et al., 2013; Feldt et al., 2014).

Electronic waste (e-waste) is the fastest-growing section of the overall waste streamglobally, generating an estimated 50 million metric tons yearly (Kumar et al.,2017; Shevchenko et al., 2019; Maes& Preston-Whyte, 2022). This surge in e-waste is due to the increased disposal of electrical electronic equipment (EEE)within developing countries and the shipment of used materials from the developed world to the developing world (Shevchenko et al., 2019). The short lifespan of EEE and the increasing demand for newer and more efficient technologies have led to the rapid discarding of EEE worldwide (Shahabuddin et al., 2023).Furthermore, the need to bridge the perceived digital divide between developed and developing countries and the trail of global production and consumption have also driven the increased discarding of materials such as mobile phones, refrigerators, and computers (Pickren, 2014; Vassilakopoulou&Hustad, 2021).

The environmental impact resulting from e-waste re-cycling and disposal has been reported in many countries, including China, Germany, India, Sweden, and Asia (Otache et al., 2014; Borthakur, 2016; Cayu-mil et al., 2016; Mohammed, 2022). The disposal and recycling of e-waste in an environmentally unsound way can pose significant risks to human health and the environment due to the presence of heavy metals and organic compounds of chlorine and bromine (Fadaei, 2022). The improper handling of electronic waste (e-waste) has resulted in significant environmental and health concerns globally. Heavy metal emissions into the environment through e-waste processing activities have been reported to leach into groundwater and soil, posing a risk to human health (Afolayan, 2018; Liang et al., 2022). Studies conducted in Nigeria have revealed high levels of copper, nickel, zinc, and lead, exceeding the European Union limits, in plants and nearby surface water in e-waste dumpsites in Lagos, Benin, and Aba cities (Nnorom, 2009; Senthilnathan& Philip, 2023). This study aim to assess Ladipoe-waste

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workers knowledge levelsas regards to potential health risks associated with electronic waste in Ladipo market, Lagos State, Nigeria.

2. Materials and Method

2.1 Description of Study Area

The study conducted in Ladipo auto spare part market (6º54'00.0"N 3º34'43.0"E)is a market located in Mushin Local Government Area (LGA) situated in Lagos State, Nigeria. Mushin Local Government Area is located in the heart of Lagos bounded in the North by Oshodi-Isolo Local Government to East by Shomolu Local Government and in the South by Mainland Local Government. According to the 2006 Census, the enumerated population of Mushin was 633,009 and has an area of 17.01 km^2.Located approximately 10 km north of the city of Lagos and adjacent to the main road to Ikeja, it also share boundary to the South with Surulere local government and it also share boundary with Oshodi – Apapa expressway in west. The majority of the people belongs to the Yoruba ethnic group and are predominantly trader and government workers. The average temperature during the dry season and rainy season is 28^0C and 31^0C respectively[4]. The study area geographical landscape comprises islands, sandbars and lagoons.

2.2 Research Design

The research adopted a descriptive cross-sectional research design for this study. A descriptive survey design is survey research which aimed at collecting data on, and describing in a systematic manner, the characteristic feature or facts about a given population (Aginam, 2008). Also, descriptive survey research design is one in which a group of people or items are studied by collecting and analyzing data from only few people or items considered to be representative of the entire group (Babu et al., 2007). This design was considered for this study because it focused on obtaining information and analyzing data from a group of people considered as representative ofLadipo auto market of Mushin Local Government Area of LagosState to determine the assess Ladipo e-waste workers knowledge level regarding potential health risk associated with electronic waste in lagos state furthermore this is appropriate because it will make it easier to reach a substantial number of the sample population component or behavior, which allows quantitative aspects to be processed.

2.3 Study Population

The study population covered trader and waste management workers in Ladipo auto market in Mushin Local Government Area of Lagos state of Nigeria. Ladipo market is known for its position as the primary spare parts market in Nigeria. The market is a hub for mechanics, car owners, and those in search of fairly used cars, spare parts, and phones. The market is highly popular and strategically located, making it easily accessible for those in search of these products.

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2.3.1 Sample Size

A proportion of the population would be determined through Cochran formula (Kothari, 2004). The Cochran formula allows calculation of an ideal sample size given a desired level of precision, desired confidence level and the estimated proportion of the attribute present in the population. The Cochran formula is:

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where:

- e is the desired level of precision(i.e. the margin of error).
- p is the estimated proportion of the population which has the attribute in question.
- q is 1-p.
- The z-value is found in a Z table.

In relation to this study, since we don't have much information about the subjects, this gives us maximum variability. So p = 0.5. Then assume that there should be 95% confidence, and at least 5% plus or minus = precision. A 95% confidence level gives us Z value of 1.96. So the sample size will be:

$$= \frac{(1.96^2)(0.5)(0.5)}{0.05^2} = 385$$

For the purpose of the study 25% of this is used as the sample size

$$= \frac{25}{100} \times 385$$

$$= 96.25$$

Grand total size is 96 traders and waste workers

2.3.2 Population Inclusion Criteria

The inclusion criteria states that the subject must be part of target population (Lin et al., 2002). This research emphasizes the importance of defining who was a part of the study. Accordingly, the following points will be used to aid in sampling of appropriate sample for inclusion purposes;

I. All trader and waste workers are being selected
II. Respondents must be a shop owner at the time of conducting this research.
III. And only those who agree to participate and signed informed consent were used in the research.

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2.3.3 Population Exclusion Criteria

Exclusion criteria are certain population traits that a study population lack. The following trader who was not available and waste workers who is at on duty will be excluded from the study;

I. Traders who was not physically available and waste workers who was not present at the time of conducting this research
II. And does who did not agree to sign the consent form, were excluded.

2.4 Sample and Sampling Techniques

The sample comprised of 96trader and waste workers will beselected across the sample area. A scientific procedure which combined both probability and non-probability sampling technique will be adopted for this study. Purposive sampling which is a non-probabilistic technique will be used to select Ladipo auto market in Mushin Local Government Areaof Lagos State while the stratified sampling was used in the selection of participants from the population and simple random technique for selection of traders and waste workers. The stratified and simple random sampling are probabilistic in nature. The table below gives a clarity.

Table 1: Multi Stage Sampling Procedure

Stages	**Sampling Techniques**
First Stage	Purposive selection of Mushin Local Government Area
Second stage	Purposive selection Ladipo Auto Spare Part Market, Lagos State.
Third Stage	Stratified Selection of participants from the population
Fourth Stage	Simple random selection of traders across the market.

2.5 Data Collection

Data were collected using a structured self-administered questionnaire comprising both open and closed ended questions and consisting of five divisions, numbered A to C. Section A covers respondents' demographic information, Section B covers respondents' traders market knowledge and work practices, Section C covers respondents' health work practices.

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2.5.1 Consent

Thorough objectives of the study were explained to the each of the respondents and an informed consent, included on the first page of the questionnaire, which was filled by participants before they filled the questionnaire. Those who did not consent were excluded, and incomplete forms were regarded as non-response. A pre-tested semi-structured questionnaire were used. The design of the questionnaire was based on information from prior studies and it was designed in English Language.

The assurance of anonymity and confidentiality was clearly stated as the researcher identifies health issues as a sensitive issue. So, in order to maintain confidentiality, identification numbers were not used. It was believed that the responses provided are correct.

2.6 Validity and Reliability of instruments

To guarantee validity of instruments, the instruments was developed under the guidance of a supervisor. After designing the questions, it was pretested to a tenth of the sample size (96 respondents). This assisted in identifying ambiguous questions in the instruments and was able to re-align them to the objectives.Reliability is the degree to which the measuring instruments will deliver consistent scores when the similar groups of people are repeatedly measured under similar conditions. One type of questionnaire was administered to traders and the Cronbach reliability test was used in measuring the consistency of the instrument.

2.7 Data Analysis

The data that were obtained from the questionnaire will be analyzed using the Statistical Package for Social Science (SPSS) software package. Frequency distributions and percentages were derived for variables. And Pearson product moment correlation and Chi square test will be used to see if there is any relationship between the variables of study also hypotheses test will be conducted at 5% statistical level.

3.0 Results and Discussion

3.1 Questionnaire administration and returned rate

A total of ninety six (96) copies of questionnaires were administered to trader inLadipo market of Lagos State andthe whole ninety six (96) copies of the questionnaires were returned and found usable for data analysis, giving a return rate of 100%.

Table 2: Demographic information of respondents of the e-waste workers, trader in Ladipo market, Lagos State, Nigeria.(Total Population = 96)

Variables	Frequency	Percentage (%)	Mean ($\overline{X}$)
Category			
Recycler	13	13.5	
Trader /Importer	65	67.7	2.05
Repairer	18	18.8	

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Gender			
Male	92	95.8	
Female	4	4.2	
Age Group			
19 years and below	6	6.3	
20-29 years	21	21.9	
30-39 years	22	22.9	3.56
40 -49 years	18	18.8	
50 -59 years	18	18.8	
60 years and above	11	11.5	
Marital Status			
Single	16	16.7	
Married	73	76.0	1.91
Widow	7	7.3	
Religion			
Islam	6	6.3	
Christianity	85	88.5	2.0
Others	5	5.2	
Household Size			
1-5 size	30	31.3	
6-10 size	63	65.6	1.72
11 and above	3	3.1	
Level of Educational			
Primary education	7	7.3	
Secondary education	31	32.3	2.67
Tertiary education	46	47.9	
Others Specify	12	12.5	

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Monthly Income range (Naira)			
Less than 49, 999	0	0.00	
50,000 to 99,999	5	5.2	
100,000 to 299, 999	28	29.2	3.86
300,000 to 499,999	38	39.6	
500,000 or More	25	26.0	

Computed from field data, 2023.

Table 2 showed that 65 respondent representing67.7 % are either trader or importer of e-waste product, 18 respondent representing18.8% are repairer of e-waste product while the remaining 13 respondent representing13.5% are Recycler of e-waste product. The reason being that most people at Ladipo market are mostly trade and importer of e-waste product and are less concern with either recycler and repairer. The result also revealed that 92representing 95.8% are male and their female counterparts are 4 representing 4.2%, these means that they were more male's then female's marketers who correctly completed the questionnaire at Ladipo market, Mushin Local Government Area (LGA), Lagos State, Nigeria. Thus, male respondents dominated the study population. The age group distribution of the marketers showed that age group 19 years and below having 6respondents which represent 6.3%, 20-29 years having 21respondents which represent 21.9%, 30-39 years having 22respondents which represent 22.9%, 40-49 years having 18respondents which represent 18.8%, 50-59 years having 18respondents which represent 18.8% while 60 years and above having 11respondents which represent 11.5%. It has been revealed that the majority of the sample population are between the ages 30-39 years which dominate Ladipo market. This is line with Federal Ministry of Trade, Industry and Investments (FMITI) report, which asserted that over 47 % of Nigerian population business owner are between the age brackets. The implication of this findings is that majority are young business owns. The result also revealed that 16 respondents which represent(16.7%) are single, 73 respondents which represent(76.0%) are married while 7 respondents which represent(7.3%) are widow and the result has shown that most of the marketer are mostly married. It was seen that 6 respondents which represent(6.3%) are Muslim, 85 respondents which represent(88.5%) areChristians while are Muslim while 5 respondents which represent(5.2%) choose others region (Adebayo, 2025). This implies that there are more Christians in this research work.

The result also revealed that 30 respondents which represent(31.3%) are between 1-5 household sizes, 63 respondents which represent(65.6%) are between 6-10 household sizes while 3 respondents which represent(3.1%) are between 11 and above household size and the result has shown that most of the marketer fall between the household sizes of 6-10 members.

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The results also showed the level of education of respondents in this fieldwork, respondents with highest education level showed that 7 respondents which represent(7.3%)went to primary education, 32 respondents which represent(33.3%)went to secondary education, 46 respondents which represent(47.9%)went to tertiary education while 11 respondents which represent(11.5%)are those who represent other specify education and the result has shown that most of the marketer university or poly graduate.

And lastly, the results of the monthly income range or trader, importers, repairer and recycler, the result also revealed that 5 respondents which represent(5.2%) are between 50,000 to 99,999 income range, 28 respondents which represent(29.2%) are between 100,000 to 299,999 income range, 38 respondents which represent(39.6%) are between 300,000 to 499,999 income range while 25 respondents which represent(26.0%) are between 500,000 or above income range and the result has shown that most of the trader at Ladipo market makes at least 300,000 to 499,999 monthly.

3.2 Answer to research questions

This section provides answers to the research questions that guided the study.

3.2.1 Research Question One: What are the socio-economic characteristics of e-waste workers within the studied market?

Table 3: Show the socio-economic characteristics of e-waste workers within the studied market.

Question	Description	Frequency	Percentage (%)	Mean $\bar{x}$
Household Size	1-5	30	31.3	
	6-10	63	65.6	1.72
	11 and above	3	3.1	
Level of education	Primary	7	7.3	
	Secondary	31	32.3	2.67
	Tertiary	46	47.9	
	Others Specify	12	8.3	
Monthly income range	50,000 to 99,999	5	5.2	
	100,000 to 299,999	28	29.2	
	300,000 to 499,999	38	39.6	3.86

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	500,000 or above	25	26.0	

Computed from Field Data, 2023

Table 3 showed revealed that Household Size ($\bar{x}$=1.72), Level of education ($\bar{x}$=2.67), Monthly income range ($\bar{x}$= 3.87). The result shows the socio-economic characteristics of e-waste workers within the studied market about the respondent outcome household size, level of education and monthly income rangehas influence strong positive relationship with health risk awareness and practices with (r=0.004, n=96, p (.967)>.05).

3.3.2 Research question two: How do e-waste workers acquire knowledge about health risks associated with their occupation?

Table 4: Show the e-waste workers acquire knowledge about health risks associated with their occupation.

Question	Description	Frequency	Percentage	Mean $\bar{x}$
Have you ever heard of the term E-waste	Yes No	88 8	91.7 8.3	1.08
If yes, what do you understand by E-waste	Electrical items waste Electrical appliances TV and DVD waste Radio waste Imported laptop waste	54 13 8 8 13	56.3 13.5 8.3 8.3 13.5	2.09
If yes, how did you hear about E-waste	School Television/Radio Online Newspaper/Magazine Family and Friends Others	15 21 8 8 44	15.6 21.9 8.3 8.3 45.8	3.47

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Computed from Field Data, 2023

Table 4 revealed that Have you ever heard of the term E-waste ($\bar{x}$=1.08), If yes, what do you understand by E-waste($\bar{x}$=2.09), If yes, how did you hear about E-waste ($\bar{x}$= 3.47). The result shows the socio-economic characteristics of e-waste workers within the research area has shown that most of the respondent has had about e-waste on a television or radio station and this has shown that the main source of information is television or radio.

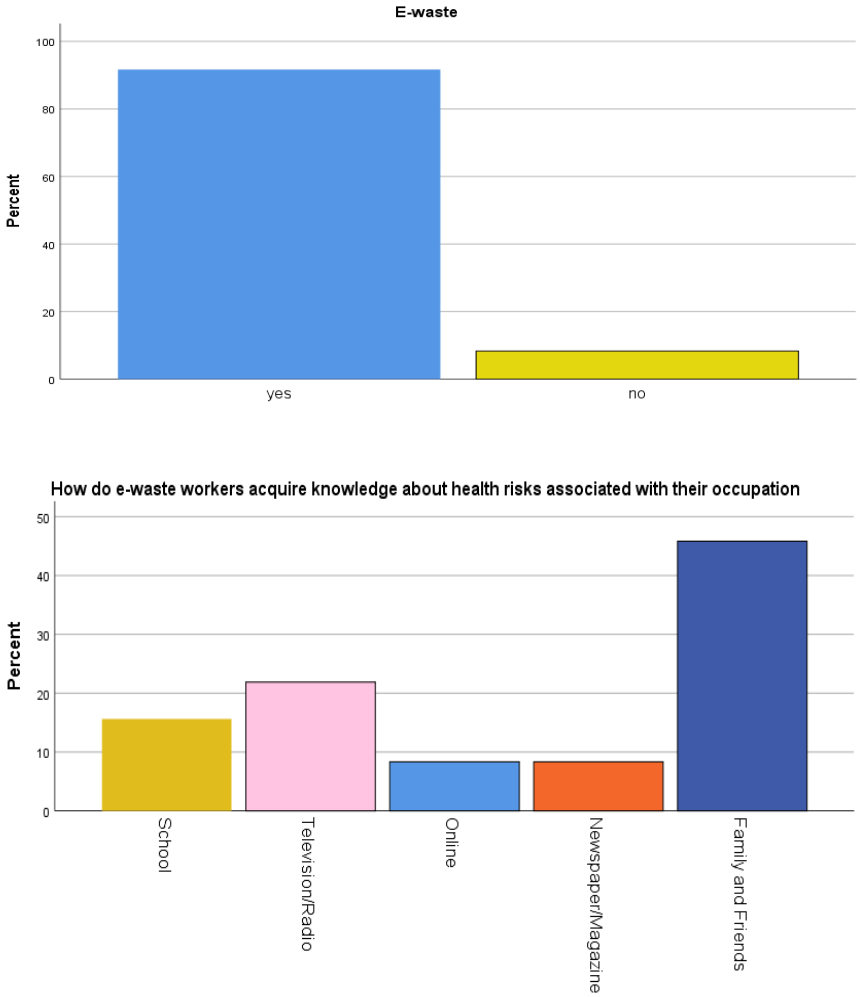

Figure: (1) Percentage Showing E-Waste Level. (2) Percentage Showing How E-Waste Workers do Acquire Knowledge About Health Risks Associated with their Occupation.

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3.3.3 Research question three: To what extent do socio-cultural factors impact the adoption of safety measures among e-waste workers?

Table 5: Show the socio-cultural factors impact the adoption of safety measures among e waste workers.

Question	Description	Frequency	Percentage	Mean $\bar{x}$
Do you feel the need to protect yourself when handling or being around your goods	Yes	56	58.3	
	No	40	41.7	1.42
Have you experienced any health issues that you think is linked to the work you are doing	School	15	15.6	
	Television/Radio	21	21.9	
	Online	8	8.3	
	Newspaper/Magazine			3.47
	Family and Friends	8	8.3	
	others			
		44	45.8	
Accidental illness, injury/pricking with sharp objects	Eye irritation	14	14.6	
	Skin rash/inflammation	22	22.9	
	Nasal irritation/nasal sting	10	10.4	
	Cough/sneeze	21	21.9	3.65
	Inconvenient breathing/jamming	8	8.3	
	Peeling skin	9	9.4	
		12	12.5	

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Have you experienced any of these symptoms while working with your goods	Yes No	52 44	54.2 45.8	1.46
Do you perceive any health risk can come from these goods you've acquired or trade in	No Yes(Toxicity or Safety Hazard for people) Yes, Environmental Problem Yes, Others	15 50 14 17	15.6 52.1 14.6 17.7	2.34
Do you worry about your health or that of your family due to your work environment	No, do not worry Previously worried, but no longer worried Little worried Yes, very worried	11 11 54 20	11.5 11.5 56.3 20.8	2.86
Do you change your clothes after work before going home	Yes No Sometimes	61 24 11	63.5 25.0 11.5	1.48

Computed from Field Data, 2023

Table 5 revealed that Do you feel the need to protect yourself when handling or being around your goods ($\bar{x}$=1.42), Have you experienced any health issues that you think is linked to the work you are doing ($\bar{x}$=3.47), Accidental illness, injury/pricking with sharp objects($\bar{x}$=3.65), Have you experienced any of these symptoms while working with your goods($\bar{x}$=1.46), Do you perceive any health risk can come from these goods you've acquired or trade in($\bar{x}$=2.34), Do you worry about your health or that of your family due to your work environment($\bar{x}$=2.86), Do you change your clothes after work before going home ($\bar{x}$=3.87). The result shows the socio-cultural factors impact has a relationship with safety measures on e-waste workers.(r=0.097, n=96, p (.347)>.05).

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3.3.4 Research question four: How does the level of education and training influence e-waste workers' understanding of health hazards?

Table 6: Show the level of education and training influence e-waste workers' understanding of health hazards.

Question	Description	Frequency	Percentage	Mean $\bar{x}$
What do you do with your goods that don't get sold or remain from your use as waste.	Sell dismantle for useful parts use personally throw away	40 39 9 8	41.7 40.6 9.4 8.3	1.88
Do you consider your unused goods to be waste, or to have another purpose	No, they Repaired and/ Reused No, Components /Ra Materials Yes, It Is Waste Conditional	57 30 9 0	59.4 31.3 9.4 0.0	1.5
Do you know someone who can collect your unused goods for recycling, or dismantling and refabricating, or destroying	Yes No	42 54	43.7 56.3	2.88
Do you see any hazards or risks to the growing amount of e-waste in Ladipo	Yes No	74 22	77.1 22.9	1.23

Computed from Field Data, 2023

Table 6 revealed that what do you do with your goods that don't get sold or remain from your use as waste($\bar{x}$=1.88),, Do you consider your unused goods to be waste, or to have another purpose($\bar{x}$=1.5), Do you know someone who can collect your unused goods for recycling, or dismantling and refabricating, or destroying($\bar{x}$=2.88),, Do you see any hazards or risks to the

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growing amount of e-waste in Ladipo($\bar{x}$=1.23),The result shows the level of education and training has a positive impact on health hazards of e-waste workers'(r= -0.067, n=96, p (.517)>.05).

3.3.5: Research question five: What are the perceived or reported health problems among e-waste workers, and how do they correlate with their understanding of health risks?

Table 7: Correlation showing the perceived or reported health problems among e-waste workers, and how do they correlate with their understanding of health risks

Variables	Mean	Std. Dev.	N	r	p-value	Remarks
The perceived or reported related health problems	3.65	1.957	96	.755*	.000	Sig.
Health Risks and Issues among e-waste workers	11.8958	2.46866				

* Correlation is significant at the 0.01 level (2-tailed).

Table 7 revealed that there is significant relationship between the perceived or reported related health problemsand Health Risks and Issues among e-waste workers, (r=.755, n=183, p (.000)>.0.01). This implies that the perceived or reported related health problems has influence on Health Risks and Issues among e-waste workers needs in the study.

Hypotheses testing

To test the hypotheses, Pearson Product Moment Correlation (PPMC) was used to examine the strength of the relationships between independent variables: E-waste workers levels of education and the demonstrated greater awareness of health risks associated with their occupation compared to those with lower educational backgrounds, how does socioeconomic status significantly influences the implementation of health and safety practices among e-waste workers, with those from higher socioeconomic backgrounds practicing safety measures, the economic benefits does E-waste add to personal income on the health risk exposed to by E-waste daily bases, From Table 7, the calculated chi-square ($\chi c2$) is greater than the tabulated chi-square ($\chi t2$) at both 5% critical limit ($p<0.05$) and, consequently, the null hypothesis is rejected. The alternate hypothesis is held. Thus, the accepted alternate hypotheses are interpreted as follows

The Following Hypotheses Will Drive The Research;

Hypothesis One

What is the significant relationship between E-waste workers levels of education and the demonstrated greater awareness of health risks associated with their occupation compared to those with lower educational backgrounds.

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Hypothesis Two

Dose socioeconomic status significantly influences the implementation of health and safety practices among e-waste workers, with those from higher socioeconomic backgrounds practicing safety measures.

Hypothesis There

What significant Economic Benefits dose E-waste add to personal income on the health risk exposed to by E-waste daily bases.

Table 8: Pearson Product Moment Correlation (PPMC) for hypotheses H_1 showing the significant relationship between E-waste workers levels of education and the demonstrated greater awareness of health risks associated with their occupation compared to those with lower educational backgrounds.

Variables	Mean	Std. Dev.	N	r	p-value	Remarks
Level of education	3.65	0.792	96	-.067	0.517	Sig.
Health Risks and Issues among e-waste	11.8958	2.46866				

* Correlation is not significant at the 0.05 level (2-tailed).

Table 8 showed that there is no significant relationship between the Level of education and Health Risks and Issues among e-waste workers, (r= -0.67, n=96, p (.517)>.0.01). This implies that yourchoose of category or occupation has an effect in your level of health risk exposition at your choose occupation and also your Level of education dose not determine if you will not be expose to health risk associated to e-waste needs in the study.

Table 9: Pearson Product Moment Correlation (PPMC) for hypotheses H_2 showing the socioeconomic status if it significantly influences the implementation of health and safety practices among e-waste workers, with those from higher socioeconomic backgrounds practicing safety measures.

Variables	Mean	Std. Dev.	N	r	p-value	Remarks
Socioeconomic Status	8.2396	1.38218	96	-0.010	0. 926	Sig.
Health and Safety Practices	39.9271	3.41281				

* Correlation is not significant at the 0.05 level (2-tailed).

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Table 9 showed that there is no significant relationship between the Socioeconomic Status and the implementation of health and safety practices among e-waste workers, (r= -0.010, n=96, p (.926)>.0.01). This implies that various socioeconomic status of e-waste workers does not have any influenceson health and safety practices among e-waste workers and also higher socioeconomic backgrounds practice dose not ascertain safety.

Table 10: Pearson Product Moment Correlation (PPMC) for hypotheses H_3 showing the significant Economic Benefits E-waste add to personal income on the health risk exposed to by E-waste daily bases.

Variables	Mean	Std. Dev.	N	r	p-value	Remarks
Monthly income	3.86	0.866	96	0.033	0.752	Sig.
Health Risks and Issues among e-waste workers	11.8958	2.46888				

* Correlation is significant at the 0.05 level (2-tailed).

Table 10 showed that there is significant relationship between the economic benefitsE-waste add to personal income on the health risk exposed to by E-waste daily bases among e-waste workers, (r= 0.033, n=96, p (.752)>0.05). This implies that E-waste add to personal income and has a significant relationship with health risk because the more you earn the expose you are the work hazard.

3.5 Discussion of Findings

The aim of thisstudy is to investigate and assess Ladipo e-waste workers knowledge levels regarding potential health risks associated with electronic waste in Ladipo market, Lagos State, Nigeria.The level of pollutionat prominent e-waste processing facilities, coupled with extensive human exposure to toxic substances, indicates afundamental deficiency in existing management techniques aimed at safeguarding environmental and human health(Caravanos et al., 2013; Akortia et al., 2017).

Findings from the study revealed that most of those engage in electronic wasteswhich involves recycler, trader /Importer and repairer. Although the trader of e-wastes product are mostly dominated by male and married couples in area of study. This study also discovered that most of the market traders are aware of the E-waste and have a better understanding the risk associated with waste and also most respondent has had of electronica waste from a television or radio station and involved in the business has stayed at least 6yearsand above. The result of these is that government regulation determines e-waste management practices adopted by traders. This

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supports the findings of (Mwathi, 2014) but counters the observation of (Okoye and Odoh, 2014)that lack of government regulation hinders ICT workers from carrying out proper e-waste management practices.

What is the significant relationship between E-waste workers levels of education and the demonstrated greater awareness of health risks associated with their occupation compared to those with lower educational backgrounds.

Theresult in Table 8 showed the responses of the respondents on the Level of education with means of 3.65 and it standard deviation 0.792 and health risk with means of 11.8958and it standard deviation 2.46866, the result has shown that significant relationship between the Level of education and Health Risks and Issues among e-waste workers (r= -0.67, n=96, p (.517)>.0.01), the result can further suggest a noteworthy connection between the educational levels of e-waste workers and their awareness of health risks, as well as their adherence to safety practices. Workers with higher educational backgrounds appear to exhibit greater knowledge and understanding of potential health hazards linked to e-waste handling. This heightened awareness likely contributes to a more conscientious approach to safety measures among these individuals. The implication is that educational interventions and programs could play a pivotal role in improving overall safety standards within the e-waste industry.

By enhancing the educational opportunities for workers, particularly those with lower educational backgrounds, there is potential for a positive impact on health and safety outcomes. This discussion underscores the importance of ongoing efforts to promote education and training within the e-waste sector, with the goal of fostering a safer working environment for all workers involved in this critical industry. The Study indicate that e-waste workers with higher levels of education tend to demonstrate greater awareness of health risks associated with their occupation compared to those with lower educational backgrounds. Education can contribute to increased knowledge and understanding of potential hazards, leading to improved awareness and adoption of safety measures among workers in the e-waste industry

Does socio-economic status significantly influences the implementation of health and safety practices among e-waste workers, with those from higher socioeconomic backgrounds practicing safety measures.

Theresult in Table 9 showed the responses of the respondents on the Socioeconomic Status of e-waste workers with means of 8.2396 and it standard deviation 1.38218 and health risk with means of 8.2396 and it standard deviation 3.41281 the result has shown that Socioeconomic Status has a positive relationship health risk with (r= 0.033, n=96, p (.752)>0.05).The result further suggests that socioeconomic status can indeed impact the implementation of health and safety practices among e-waste workers. Workers from higher socioeconomic backgrounds may have better access to education and resources, influencing their adherence to safety measures compared to those from lower socioeconomic backgrounds. Also socioeconomic status has been

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shown to influence the adoption of health and safety practices across various occupational settings, including among workers in different industries.

What significant Economic Benefits dose E-waste add to personal income on the health risk exposed to by E-waste daily bases.

The result in Table 10 displays the responses concerning the economic impact of e-waste on personal income, with a mean of 3.86 and a standard deviation of 0.866. This data suggests that e-waste represents a significant business opportunity, as discarded electronic waste is rapidly increasing in industrialized nations. The growth in economic benefits is driven by consumers' demand for the latest electronic gadgets. Devices that are simpler, lighter, and more advanced, such as smartphones (Kothari, 2014), tend to have higher consumption rates.

It's unsurprising, given that the electronics sector primarily flourishes on the continual evolution of new products, leading to increased growth and production rates. The health risk has the mean of 11.8958 and it standard deviation 2.4688, the result has review that has the personal income increases and has well has the health risk. The result further showed us that there is an existing relationship between economic benefitsE-waste add to personal income and the health risk exposed to by E-waste daily bases among e-waste workers ($r= 0.033$, $n=96$, p (.752)>0.05). This implies that E-waste add to personal income and has a significant relationship with health risk because the more you earn the expose you are the work hazard.

4.0 Summary, Conclusion And Recommendations

4.1 Conclusion

The electronic waste problem constitutes major concern of the scientific community and the involved stakeholders however the incrementally increasing application and development of modern technologies each year, massive amounts of e-wastes are being produced continuously. Nevertheless, if we think about the positive side of modern technologies (e.g., advanced computing, robotics, lifesaving medical instruments, home appliance and so on), we cannot stop theemerges of modern technologies due to its necessity in daily life. However, we can establish effective e-waste recycling management systems by offering sustainable e-material consumption and production patterns and, where feasible, avoiding hazardous materials (e.g., utilizing biodegradable polymers) while manufacturing electrical equipment. Some metals used in electronics are highly toxic and harmful for living organisms and the environment. When they get into the soil sub-surface, sediments and water, then they form complexes. Thus, it is challenging to handle metals due to their complex formation and harmful environmental and animal impacts. Among all the previously used methods discussed in this review, biological and hybrid treatment processes have high removal capability and high public acceptability. Finally, it is important to explore new methods from other process objects based on similar characteristic for better performance than existing technologies.

4.2 Recommendations

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Based on the finding and the conclusion made, the following recommendations are made;the government of Lagos State should pass into law a more comprehensive bill that provides special consideration for e-waste recyclers, trader\importer and disposal. The bill when passed into law should; empower the relevant agencies to sensitize the public, supervise and regulate the activities of e-waste management; formulate legal procedures for reporting of illegal e-waste recycling, dumping and importation; lay down legal procedures to be used in cases of default with stiff penalties for defaulters based on the toxicity of the waste, severity of environmental pollution and severity of health hazards.The study also recommends that artisans who repair electrical gargets such phones, computers and etc. they should liaise with the government to form a formidable association. This will encourage knowledge sharing and problem solving as a group. It will also make the planning of sensitization programs of government and non-governmental organizations easy. The Lagos state and Nigerian government should therefore provide adequate technical aid and resources for proper e-waste management in order to keep the society safe from health and environmental hazards that can result from e-waste burning and other improper practices.

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