

An Assessment on Public Awareness Regarding E-Waste Hazards and Management

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ABSTRACT:

Rapid changes in technology, changes in media (tapes, software, MP3), falling prices, and planned obsolescence have resulted in a fast-growing surplus of electronic waste around the globe. Technical solutions are available, but in most cases, a legal framework, a collection, logistics, and other services need to be implemented before a technical solution can be applied. This paper is an attempt to analysis and assessment on public awareness regarding E-Waste hazards and management

Keywords- ICT, E-waste, assessment and management practices

INTRODUCTION-

Electronic waste or E-waste describes discarded electrical or electronic devices. Used electronics which are destined for reuse, resale, salvage, recycling, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution.

Electronic scrap components, such as CPUs, contain potentially harmful components such as lead, cadmium, beryllium, or brominated flame

retardants. Recycling and disposal of e-waste may involve significant risk to workers and communities in developed countries and great care must be taken to avoid unsafe exposure in recycling operations and leaking of materials such as heavy metals from landfills and incinerator ashes. "Electronic waste" or "E-Waste" may be defined as discarded computers, office electronic equipment, entertainment device electronics, mobile phones, television sets, and refrigerators. This includes used electronics which are destined for reuse, resale, salvage, recycling, or disposal. Others are re-usables (working and repairable electronics) and secondary scrap (copper, steel, plastic, etc.) to be "commodities", and reserve the term "waste" for residue or material which is dumped by the buyer rather than recycled, including residue from reuse and recycling operations, because loads of surplus electronics are frequently commingled (good, recyclable, and non-recyclable), several public policy advocates apply the term "e-waste" broadly to all surplus electronics. Cathode ray tubes (CRTs) are considered one of the hardest types to recycle.

Table 1.1: Predicted population growth overall impact on waste generation

Year	Population	Per capita generation (Kg per day)	Total waste generation (tonnes per year)
2001	197.3	0.439	31.63
2011	260.1	0.498	47.30
2021	342.8	0.569	71.15
2031	451.8	0.649	107.01
2036	518.6	0.693	131.24
2041	595.4	0.741	160.96

Source: Report on sustainable solid waste management in India. Waste to energy research and technology council (<http://swmindia.blogspot.in/> accessed on 30th July 2019)

With the predictions of increasing waste generation per day in the coming years it is necessary to review the risks imposed by e-waste and attempt to formulate strategies to tackle the issue.

1.2 Status of E-Waste Management in India-

Despite a wide range of environmental legislation in India there are no specific laws or guidelines for electronic waste or computer waste (Devi et al., 2004). As per the Hazardous Waste Rules (1989), e-waste is not treated as hazardous unless proved to have higher concentration of certain substances. Though PCBs and CRTs would always exceed these parameters, there are several grey areas that need to be addressed. Basel Convention has Waste electronic assemblies in A1180 and mirror entry in B1110, mainly on concerns of mercury, lead and cadmium. Electronic waste is included under List-A and List-B of Schedule-3 of the Hazardous Wastes (Management & Handling) Rules, 1989 as amended in 2000 & 2003. The import of this waste therefore requires specific permission of the Ministry of Environment and Forests. As the collection and re-cycling of electronic wastes is being done by the informal sector in the country at present, the Government has taken the following action/steps to enhance awareness about environmentally sound management of electronic waste (CII, 2006):

- Several Workshops on Electronic Waste Management was organised by the Central Pollution Control Board (CPCB) in collaboration with Toxics Link, CII etc.
- Action has been initiated by CPCB for rapid assessment of the E-Waste generated in major cities of the country.
- A National Working Group has been constituted for formulating a strategy for E-Waste management.
- A comprehensive technical guide on "Environmental Management for Information Technology Industry in India" has been published

and circulated widely by the Department of Information Technology (DIT), Ministry of Communication and Information Technology.

- Demonstration projects has also been set up by the DIT at the Indian Telephone Industries for recovery of copper from Printed Circuit Boards. Although awareness and readiness for implementing improvements is increasing rapidly, the major obstacles to manage the e wastes safely and effectively remain. These include
- The lack of reliable data that poses a challenge to policy makers wishing to design an e-waste management strategy and to an industry wishing to make rational investment decisions.
- Only a fraction of the e waste (estimated 10%) finds its way to recyclers due to absence of an efficient take back scheme for consumers,
- The lack of a safe e waste recycling infrastructure in the formal sector and thus reliance on the capacities of the informal sector pose severe risks to the environment and human health.

1.3 Research Methodology- Research Methodology is a way to find out the result of a given problem on a specific matter or problem that is also referred as research problem.

Description of statistical tools used- Percentage method

In this paper following percentage method formula is used-

$$\text{Percentage of Respondents} = \frac{\text{No. of Respondent}}{\text{Total no. of respondent}} \times 100$$

Data collection method- Data was collected using questionnaire. A questionnaire consists of a no. of a number of question involves both specific and general question related to E-waste management.

Sources of Data- The two sources of data collection are namely Primary and secondary.

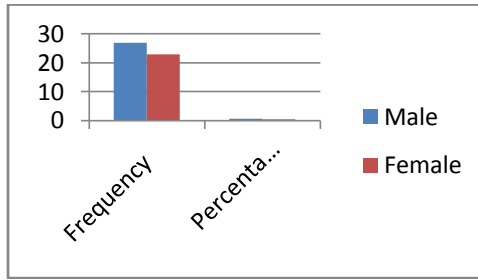
Primary Data- Primary data collected through survey from the public using Questionnaire.

1.4 Data Interpretation and Analysis-

PART A: Demographic profile

(A) **Gender:**

	Frequency	Percentage
Male	27	54%
Female	23	46%
Total	50	100%

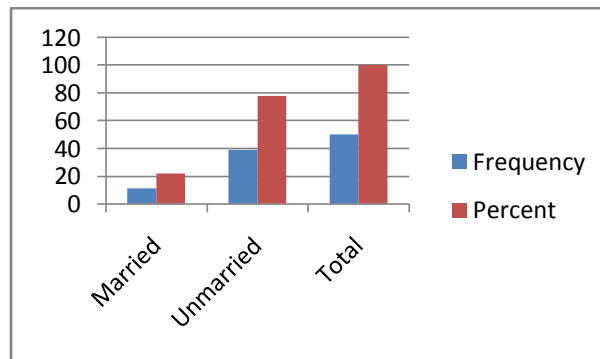


Data Interpretation:

The above graph shows that, out of 50 respondents, 54% of the respondents are male and the rest 46% are female.

(B) Marital Status:

	Frequency	Percentage
Married	11	22
Unmarried	39	78
Total	50	100

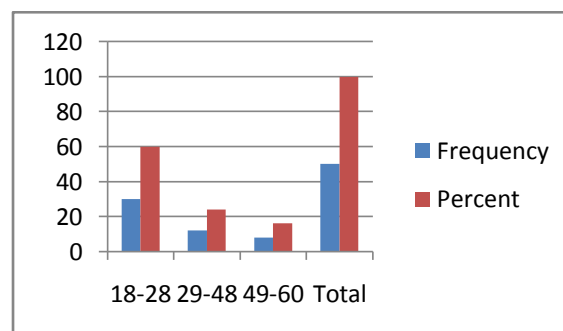


Data Interpretation:

The graph shows that the 22% respondents are married and rest 78% are unmarried.

(C) Age:

	Frequency	Percentage
18-28	30	60
29-48	12	24
49-60	8	16
Total	50	100

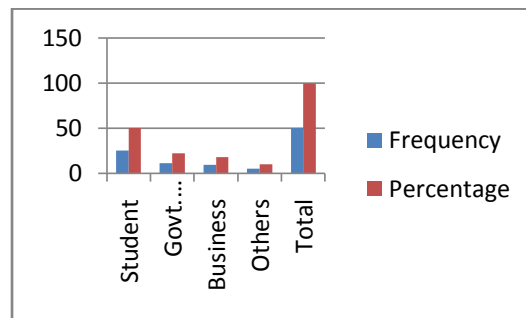


Data Interpretation:

The graph shows that the 60% respondent's age between 18 to 28yrs. and 24% respondents are between 29 to 48yrs

(D) Occupation:

	Frequency	Percentage
Student	25	50
Govt. employee	11	22
Business	9	18
Others	5	10
Total	50	100

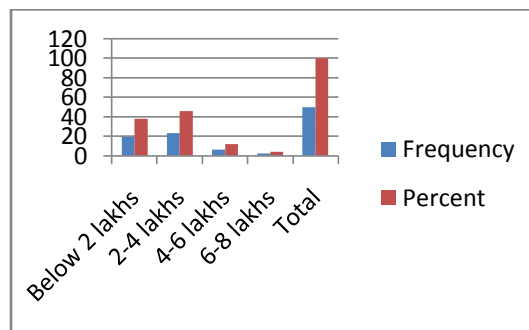


Data Interpretation:

The graph shows that the 50% respondents are student 22% are Govt. employees and % respondents have their business.

(E) Annual Income:

	Frequency	Percent
Below 2 lakhs	19	38.0
2-4 lakhs	23	46.0
4-6 lakhs	6	12.0
6-8 lakhs	2	4.0
Total	50	100.0



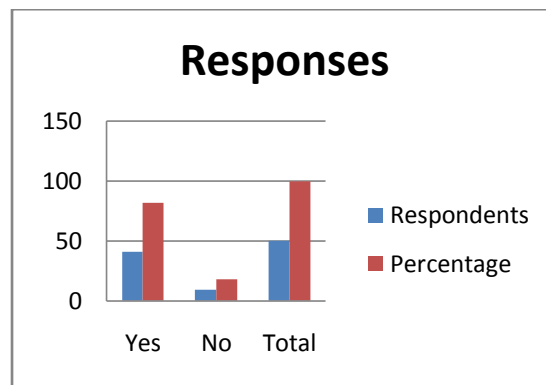
Data Interpretation:

The graph shows that 38% respondent's income is below 2 lakh.

PART B:

1. Do you know about E-waste?

Response	Respondents	Percentage
Yes	41	82
No	9	18
Total	50	100

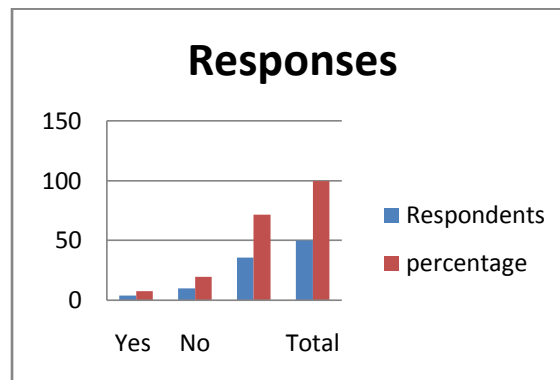


Data Interpretation:

From the above graph it is concluded that 82% respondents are aware about e-waste and only 18% respondents do not know.

2. Do waste collectors in your area pick up E-waste?

Responses	Respondents	percentage
Yes	4	8
No	10	20
There are no e-waste collectors	36	72
Total	50	100

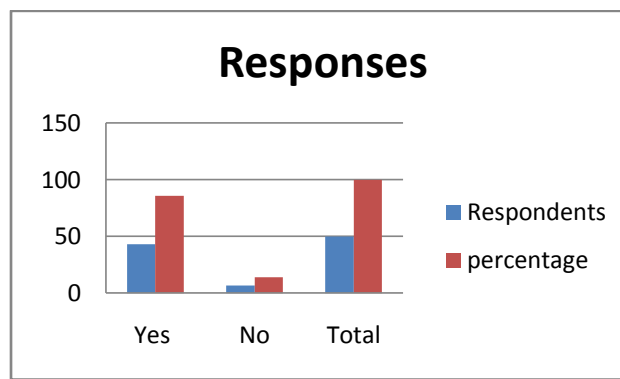


Data Interpretation:

From the above graph it shows that 72% respondents say there is no waste collector in their area.

3. Are you aware that some hazardous fractions in E-waste need special treatment in order to be safely disposed of?

Responses	Respondents	percentage
Yes	43	86
No	7	14
Total	50	100

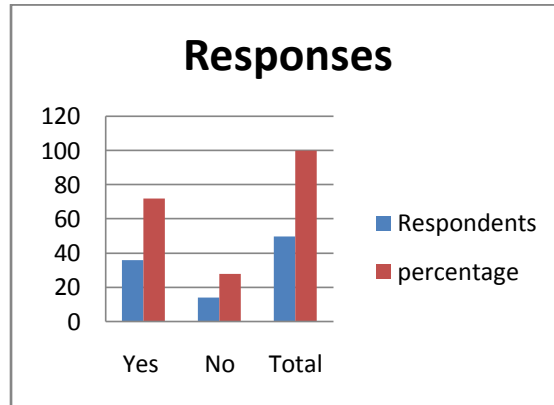


Data Interpretation:

From the above graph it can be analyzed that 86% respondents are aware that some hazardous fractions in E-waste need special treatment in order to be safely disposed off.

4. Would you give your E-waste collectors for free if you could be sure that the waste will be taken care of in a way that it does not pollute the environment?

Responses	Respondents	percentage
Yes	36	72
No	14	28
Total	50	100

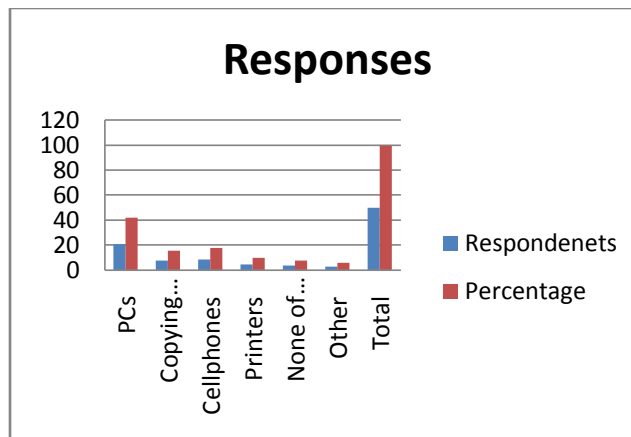


Data Interpretation:

From the above graph it can be analyzed that 72% respondents would give your E-waste collectors for free if you could be sure that the waste will be taken care of in a way that it does not pollute the environment.

5. As far as you know, do any of the following electronic devices contain materials that are hazardous for the environment?

Responses	Respondents	Percentage
PCs	21	42
Copying machine	8	16
Cellphones	9	18
Printers	5	10
None of these	4	8
Other	3	6
Total	50	100

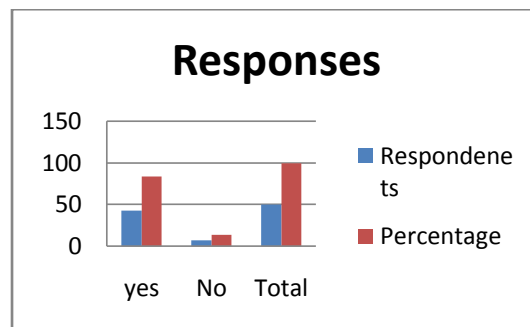


Data Interpretation:

From the above graph it is concluded that 42% respondents agree that PCs are hazardous for the environment.

6. Electronic waste can be hazardous for the environment because it contains toxic materials.

Responses	Respondents	Percentage
yes	43	84
No	7	14
Total	50	100

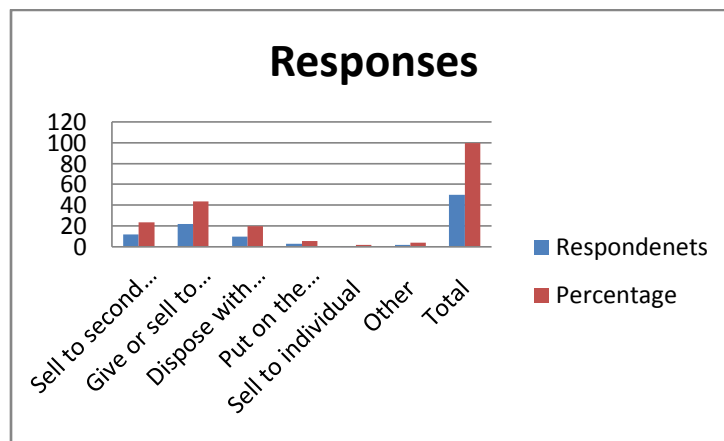


Data Interpretation:

From the above graph it shows that 84% respondents say yes electronic waste can be hazardous for the environment because it contains toxic materials.

7. How do you dispose of your electronic and electric equipment?

Responses	Respondents	Percentage
Sell to second hand dealer	12	24
Give or sell to a scrap dealer	22	44
Dispose with household waste	10	20
Put on the street	3	6
Sell to individual	1	2
Other	2	4
Total	50	100

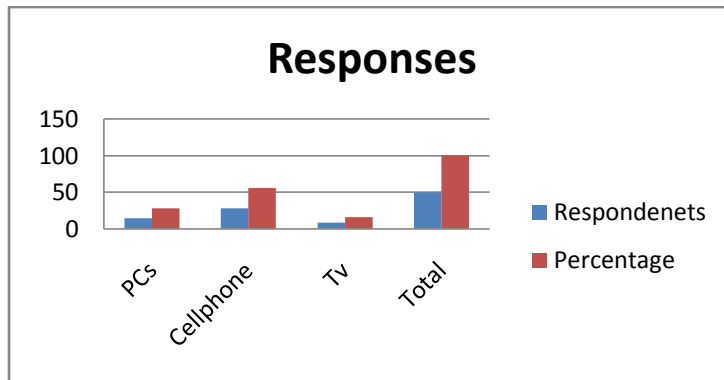


Data Interpretation:

From the above graph it shows that 44% respondents which are maximum sell to a scrap dealer.

8. What electronic gadgets do you use most frequently?

Responses	Respondents	Percentage
PCs	14	28
Cell phone	28	56
Tv	8	16
Total	50	100

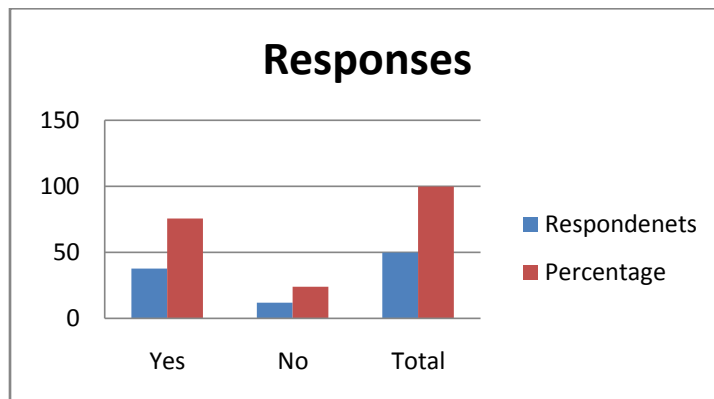


Data Interpretation:

From the above graph it can be analyzed that 56% respondents use cell phone most frequently.

9. Do you know of any local or international law pertaining to e-waste management?

Responses	Respondents	Percentage
Yes	38	76
No	12	24
Total	50	100

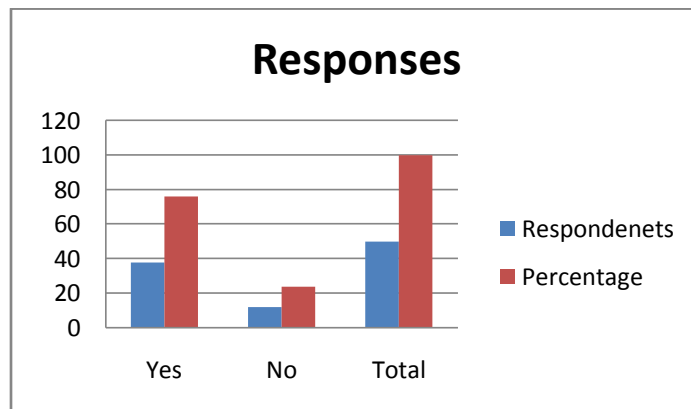


Data Interpretation:

From the above graph it can be analyzed that 76% respondents know about law pertaining to e-waste.

10. Are you aware of local programs, projects or activities pertaining electronic waste management?

Responses	Respondents	Percentage
Yes	38	76
No	12	24
Total	50	100

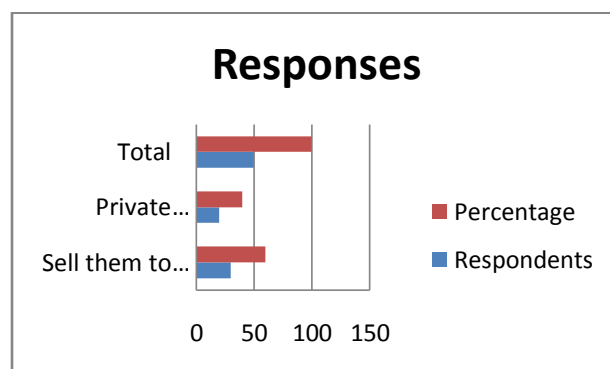


Data Interpretation:

From the above graph it can be analyzed that 76% respondents know about law pertaining to e-waste.

11. What do you do with electronic devices after they have been damaged beyond repair?

Responses	Respondents	Percentage
Sell them to junk shops	30	60
Private recycling centers	20	40
Total	50	100

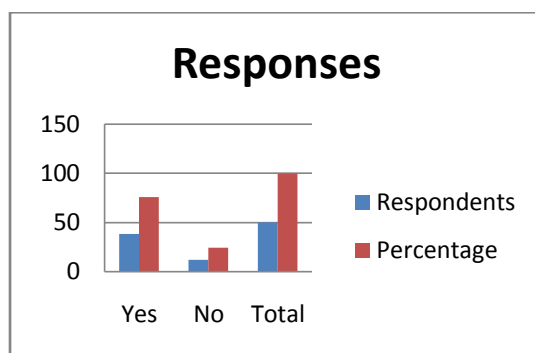


Data Interpretation:

From the above graph it can be analyzed that 60% respondents sell them to junk shops.

12. Are you aware of volume of electronic waste that you generate?

Responses	Respondents	Percentage
Yes	38	76
No	12	24
Total	50	100

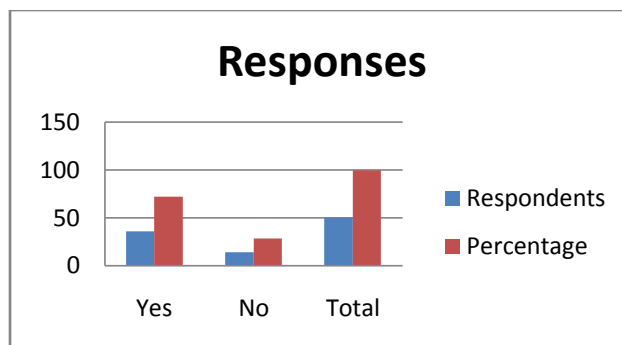


Data Interpretation:

From the above graph it can be analyzed that 76% respondents say yes they are aware of volume of electronic waste that you generate.

13. Are you aware of any health risk associated with it?

Responses	Respondents	Percentage
Yes	36	72
No	14	28
Total	50	100

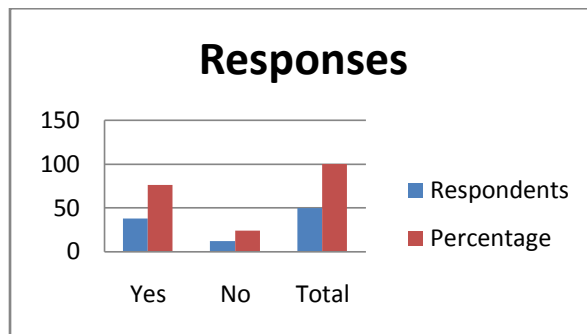


Data Interpretation:

From the above graph it can be analyzed that 72% respondents aware of health risk associated with it.

14. Does electronic waste pose a serious threat to the environment?

Responses	Respondents	Percentage
Yes	38	76
No	12	24
Total	50	100

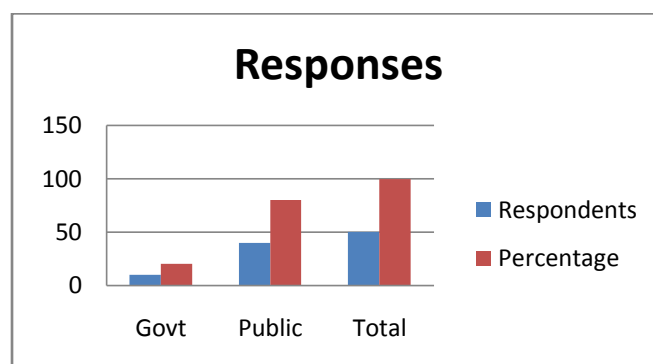


Data Interpretation:

From the above graph it can be analyzed that 76% respondents say yes electronic waste pose a serious threat to the environment.

15. Who is responsible for growing amount of e-waste in India?

Responses	Respondents	Percentage
Govt.	10	20
Public	40	80
Total	50	100



Data Interpretation:

From the above graph it is concluded that 40% respondents agree that public is responsible for growing e-waste.

1.5 Findings- 82% respondents know about e-waste. 72% respondents say there is no waste collector in their area. 86% respondents are aware that some hazardous fractions in e-waste need special treatment in order to be safely disposed of.

72% respondents would give devices to e-waste collectors for free if you could be sure that the waste will be taken care of in a way that it does not pollute the environment. 72% respondent agrees that PCs and cellphone etc. are hazardous for the environment. 82% respondents say yes these are hazardous because it contains toxic materials. 44% respondents which is maximum, sell to a scrap dealer. 56% respondents out of 100% use cellphone most frequently. 76% respondents know about

international law pertaining to e-waste. 76% respondents know about law pertaining to e-waste. 60% respondents sell electronic devices to junk shops. 76% respondents say yes they are aware of volume of electronic waste that they generate. 72% respondents aware of health risk associated with it. 76% respondents say yes electronic waste pose a serious threat to the environment. 40% respondent agrees that public is responsible for growing e-waste.

CONCLUSION-

After data interpretation and analysis I have concluded that the absence of e-waste management, lack of awareness about the health hazards, and poor control of e-waste disposal are the most common problems connected with health care related to E-wastes. An essential issue is the clear attribution of responsibility of appropriate handling and disposal of e-waste. If we want to protect our environment we should take initiatives for e-waste disposal and management.

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