

A STUDY ON THE KNOWLEDGE OF E-WASTE HANDLERS REGARDING THREATS OF E-WASTE IN UDAIPUR CITY.

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ABSTRACT

E-waste is the toxic legacy of our digital age which is contributing in the depletion of Mother Nature by polluting natural resources. Electronic and electrical waste consists of hazardous and heavy metals, which are extremely harmful to living organism. Improper disposal of these elements by informal sector leads to air, land and water pollution which causes severe impact on the living organisms and environment. The present study was undertaken to examine the different perspectives related to e-waste handling like knowledge of e-waste handlers about e-waste and e-waste threats as perceived by them. The major findings of the study were that majority of e-waste handlers had lack of knowledge about harms in e-waste collection process (42.85%), deficiency of knowledge in awareness about hazard of e-waste (45.71%), unacceptance of e-waste as a potent threat (40%), misinformation about Chemicals in e-waste harming the environment (45.71%), and lack of information Hazardous chemicals in e-waste (45.71%). Thus by this data it was concluded that there is a need to conduct periodic training among e-waste handlers right from waste collection to waste disposal including information about hazards evoked through unorganized disposal of e-waste upon mankind and environment.

Keywords: Electronic waste, Health risk knowledge, Attitude, Practice, Informal sector, Udaipur city

INTRODUCTION

Electronic waste or e-waste is one of the emerging problems in developed and developing nations worldwide. It contains multitude of components having valuable materials, some containing toxic substances which can have an adverse effect on environment and the human health. Every year 20–50 million tons of e-waste is generated globally and 100,000 tons of which is exported from UK in India, similarly large portion of international e-waste is transferred to

China.(Brigden *et al.* 2005) In a study on “Global perspectives on e-waste” it was found that India and China are number one number two in population account, even their per capita e-waste generation is less due to poverty but due to high population leads to the generation of large amount of e-waste annually (Widmer *et al.* 2005).

Due to the primitive recycling process, many pollutants, like persistent organic pollutants and heavy metals, are released from e-waste, which can easily accumulate in the human body through the inhalation of contaminated air.

Electronic products are a cocktail of several hundred tiny components, many of which contain fatal compounds lethal for human health and the environment. Majority of the components in electronic devices contain chemicals such as lead, cadmium, mercury, polyvinyl chloride (PVC), brominated flame retardants (BFRs), chromium, beryllium etc., TVs, video and computer monitors uses CRTs, which consists of consequential quantity of lead and the long term exposure to such substances can harm the nervous system, kidney and bones and the reproductive and endocrine systems and can be carcinogenic. Likewise e-wastes will have long lasting detrimental impact on the environment as when e-scrap is improperly disposed (incinerated/land filled instead of recycling) with domestic waste, without any treatments it can contaminate the soil, water and air. EEEs are made of a multitude of components, some containing toxic substances that have an adverse impact on human health and the environment if not handled properly. Usually these hazards arise in countries like India where e-waste disposal is an unorganized due to which the inappropriate recycling and discarding processes are used thus it can have major repercussions for those in propinquity to location where e-waste is recycled or burnt.

Table 1: Sources of e-waste, its constituent and its health effect on humans

S.No	Source of e-wastes	Constituent	Health effects
1.	Solder in printed circuit boards, glass panels and gaskets in computer monitors	Lead (PB)	Damage to central and peripheral nervous systems, blood systems and kidney damage. Affects brain development of children.
2.	Chip resistors and semiconductors	Cadmium (CD)	Toxic irreversible effects on human health. Accumulates in kidney and liver. Causes neural damage. Teratogenic.
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	semiconductors	(CD)	health. Accumulates in kidney and liver. Causes neural damage. Teratogenic.
4.	Relays and switches, printed circuit boards	Mercury (Hg)	Chronic damage to the brain. Respiratory and skin disorders due to bioaccumulation in fishes.
5.	Corrosion protection of untreated and galvanized steel plates, decorator or hardner for steel housings	Hexavalent chromium (Cr) VI	Asthmatic bronchitis. DNA damage.
6.	Cabling and computer housing	Plastics including PVC	Burning produces dioxin. It causes Reproductive and developmental problems; Immune system damage; Interfere with regulatory hormones
7.	Plastic housing of electronic equipments and circuit boards.	Brominated flame retardants (BFR)	Disrupts endocrine system functions
8.	Front panel of CRTs	Barium (Ba)	Short term exposure causes: Muscle weakness; Damage to heart, liver and spleen.
9.	Motherboard	Beryllium (Be)	Carcinogenic (lung cancer) Inhalation of fumes and dust. Causes chronic beryllium disease or beryllicosis. Skin diseases such as warts.

(Ramchandra and Saira, 2003)

Due to the crude recycling process, many pollutants, such as persistent organic pollutants and heavy metals, are released from e-waste, which can easily accumulate in the human body through the inhalation of contaminated air.

There are growing concerns that most of the e-waste generated in developed countries is ending up in developing countries that are economically challenged and lack the infrastructure for environmentally sound management of e-waste. This results in adverse socio-economic, public health and environmental impact of toxins in e-waste. As e-waste is an environmental threat but at the same time is also a huge source of valuable constituents and resources. Since it is growing at an alarming rate all over the world, a universal approach must be taken to meet the challenge successfully. There is a need to change our attitude and behavior towards electronic goods (e-goods) and e-waste. Efforts must be put in for keeping a control on the irresponsible use of electronic products. (Pinto, 2008)

Thus keeping in these justified facts in mind, the present study has been planned to explore the knowledge level of e-waste handlers since they are the ones who are in continual exposure with the unsafe e-waste.

MATERIAL AND METHODS

The present study was conducted in Madri Industrial Area (MIA) of Udaipur city of Rajasthan state. To procure the sample, the Waste Handler's Association was contacted. After retrieving their details, it was found that 35 waste handlers were dealing with e-waste management. So these were contacted by the researcher to collect data for the present investigation. An exploratory research design was used by the researcher for this study.

Table 1: Distribution of respondents by the knowledge about harms and hazards of electronic waste

S.no.	Item	Frequency	Percentage
1.	Harm in e-waste collection process	Yes	13 37.14
		No	7 20.0
		Don't know	15 42.85
	Total	35	100

2.	Awareness about hazards of e-waste	Yes	10	28.57
		No	9	25.71
		Don't know	16	45.71
Total			35	100

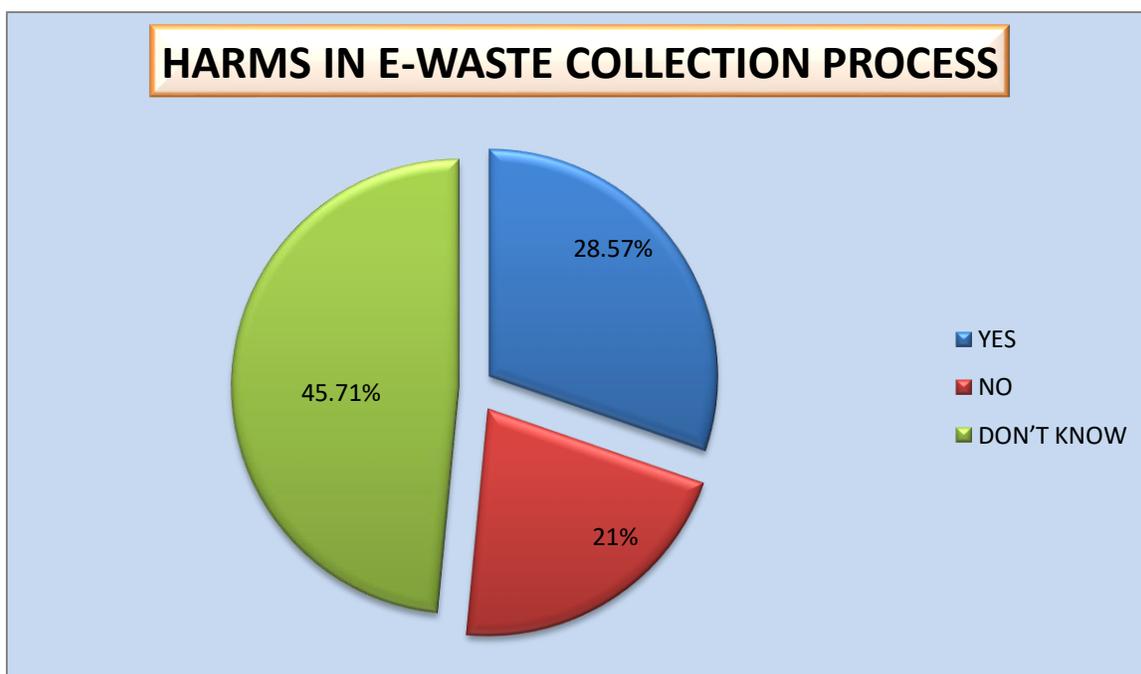


Figure 1: Harms in e-waste collection process

Harm in e- waste collection: Sloppy processing of e-waste can lead to adverse health effects. According to table 1, maximum (42.85%) respondents said that they don't know if there is any harm in e-waste collection process. 20 per cent disagreed with the fact and only 37.14 per cent were agreed that there is harm in collection of e-waste. The results substantiated with the study of Rajput (2013) who studied recycling and disposal of e-waste in the country and quoted that the workers who handled e-waste as a scrap reported health problems.

Awareness about hazards of e-waste: E-waste consists of many harmful chemicals which are proven harmful to the health of the workers. Regarding the awareness about hazards of e-waste, it was quite depressing as table 1 indicates that in pre-test, only 28.57 per cent respondents were

in favor of awareness regarding hazardous nature of e-waste, 25.71 per cent denied the fact and maximum respondents (45.71%) were unaware about it.

Table 2: Distribution of respondents according to significance of e-waste management

S.no.	Item		Frequency	Percentage
1.	Electronic waste as a potent threat	Yes	12	34.28
		No	9	25.71
		Don't know	14	40
	Total		35	100
2.	Chemicals in e-waste harming the environment	Yes	10	28.57
		No	9	25.71
		Don't know	16	45.71
	Total		35	100
3.	Hazardous chemicals in e-waste	Yes	10	28.57
		No	9	25.71
		Don't know	16	45.71
	Total		35	100

Electronic waste as a potent threat: E-waste comprises of a multitude of components with valuable materials but at the same time it also contains some toxic substances, which can have an adverse impact on human health and the environment. According to Table 2, when the respondents were asked about e-waste considered as a potent threat to the environment, 34.28 per cent people saw the threats embedded in e-waste disposal, maximum (40%) respondents lacked the knowledge about this and 25.71 per cent people denied the fact.

Chemical hazards of e-waste harming the environment: E-waste-connected health risks may result from direct contact with harmful materials such as lead, cadmium, chromium, brominated flame retardants or polychlorinated biphenyls (PCBs), from inhalation of toxic fumes, as well as from accumulation of chemicals in soil, water and food leading to environmental degradation. Regarding the awareness about chemical hazards of e-waste, it was quite depressing as Table 2 indicates that; 28.57 per cent respondents were unaware regarding hazardous nature of chemicals in e-waste damaging the environment while some of the respondents (25.71%) also thought that e-waste chemicals are not harmful for environment.

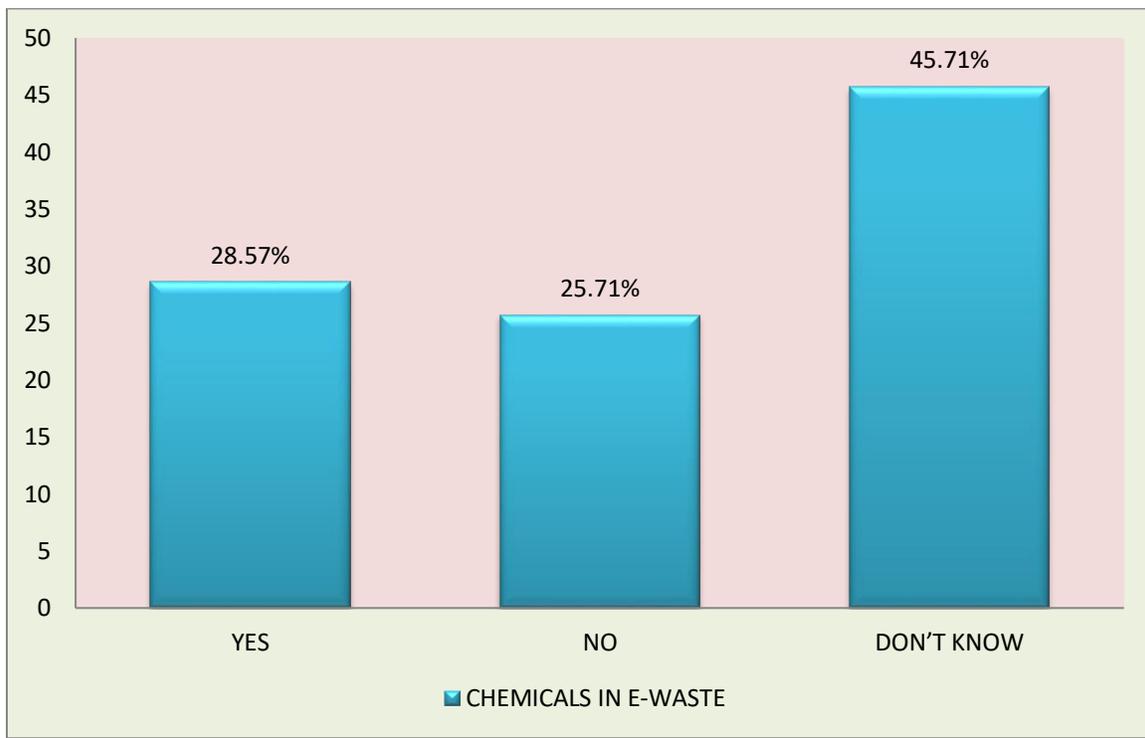


Figure 2: Knowledge about chemicals in e-waste

Hazardous chemicals in e-waste: Since e-waste handlers are the ones who are constantly exposed to the e-waste so they must know about the hazardous chemicals in e-waste. When the respondents were asked about their knowledge regarding e-waste, it was revealed in Table 4.20 that more than half (45.71%) of the e-waste handlers were unaware of hazardous chemicals present in e-waste, just 28.57 per cent respondents knew about it. 25.71% respondents repudiated the statement.

CONCLUSION AND SUMMARY

India is placed among the other global nations which have generated more E-waste in quantity and urban India especially needs an urgent approach to tackle this issue. Technical and policy-level interventions, implementation and capacity building and increasing the public awareness can convert this challenge into an opportunity to show the world that India is ready to deal with future problems and can set global credible standards concerning environmental and occupational health.

E-waste is highly complex to handle because of its composition. It is made up of multiple components some of which contain toxic substances that have an adverse impact on human

health and environment if not handled properly that is if improper recycling and disposal methods are deployed (Needhidasan, 2014). So there is a need for appropriate technology for handling and disposal of these chemicals. Following are the conclusions of this study:

1. Due to lack of knowledge, majority of respondents answered that they don't know about the harms in e-waste collection process (42.85%) while 20% denied the existence of any danger in the process of e-waste collection.
2. Respondents didn't know about any hazard related to e-waste so 25.7% e-waste handlers answered that there is no need for creating awareness regarding hazards of e-waste while majority (45.71%) of respondents were unaware about this
3. It is quite depressing that e-waste handlers who are in continuous exposure with e-waste, do not consider it as a potential threat. Study reveals that 40% respondents did not know about any threat like diseases or environmental degradation caused by e-waste while 25.71% were ignorant about it
4. When respondents were asked about chemicals present in e-waste are harming the environment majority (45.71%) of the e-waste handlers lacked the data about environmental degradation by chemicals and 25.71% respondents denied the fact.
5. E-waste consist of hazardous chemicals but 45.71% respondents were unaware about this while 45.71% respondents denied the presence of chemicals in e-waste.

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