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EFFECT OF ELECTRONIC WASTE

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ABSTRACT

:-Electronic waste (e-waste) is one of the fastest-growing pollution problems worldwide given the presence of a variety of toxic substances which can contaminate the environment and threaten human health if disposal protocols are not meticulously managed. In India, most of the waste electronic items are stored at households as people do not know how to discard them. Therefore, the need for proper e-waste management has been realized. It is necessary to review the public health risks and strategies to combat this growing menace.

I. WHAT IS E-WASTE?

E-waste or electronic waste means electrical and electronic equipment, which is not suitable for use and fills the dumps. Electronic equipment, such as mobile phones, computers, and televisions consist of hazardous materials, which pollute the environment and impact on human's health. Electronic waste is created when an electronic product is discarded after the end of its useful life. The rapid expansion of technology means that a very large amount of e-waste is created every minute. The rapid growth of technology, up gradation of technical innovations, and a high rate of obsolescence in the electronics industry have led to one of the fastest growing waste streams in the world which consist of the end of life electrical and electronic equipment product.

Health Impact

Electronic equipment's contained many hazardous metallic contaminants such as lead, cadmium, and beryllium and brominated flame-retardants. There are chances of accidents like cuts and burns during the dismantling, shredding, acid baths and incineration process, in addition, exposure to following chemicals has many long-term effects. Since e-waste is a diverse combination of the various type of toxic elements, which are capable of creating an irreversible impact on the environment and human health if not handled properly. 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. The health effects of these toxins on humans include birth defects (irreversible), brain, heart, liver, kidney and skeletal system damage.

II. ENVIRONMENTAL IMPACT

E-waste, or electronic waste, is waste from all sorts of electronics ranging from computers and mobile phones to household electronics such as food processors, pressure, cookers etc. The effects of improper disposal of this E-waste on the environment are little known; these impacts nonetheless pose very real threats and dangers to the global environment at large. Threats posed by E-waste to the environment. Improper disposal of these electronic wastes affects the soil, air, and water components of the environment.

- **Effects on air**

One of the most common effects of E-waste on air is through air pollution. For example, a British documentary about Lagos and its inhabitants, called Welcome to Lagos, shows a number of landfill scavengers who go through numerous landfills in Lagos looking for improperly disposed of electronics which includes wires, blenders, etc., to make some income from the recycling of these wastes. These men were shown to burn wires to get the copper (a very valuable commodity) in them by open-air burning which can release hydrocarbons into the air.

- **Effects on water**

When electronics containing heavy metals such as lead, barium, mercury, lithium (found in mobile phone and computer batteries), etc., are improperly disposed of these heavy metals leach through the soil to reach groundwater

channels which eventually run to the surface as streams or small ponds of water. Local communities often depend on these bodies of water and the groundwater. Apart from these chemicals resulting in the death of some of the plants and animals that exist in the water, intake of the contaminated water by humans and land animals results in lead poisoning. Some of these heavy metals are also carcinogenic.

- **Effects on soil**

In this way, toxic heavy metals and chemicals from e-waste enter the “soil-crop-food pathway,” one of the most significant routes for heavy metals’ exposure to humans. These chemicals are not biodegradable—they persist in the environment for long periods of time, increasing the risk of exposure.

III. RECYCLING TECHNIQUES

1. Pyrolysis method:-

Pyrolysis method is rapidly developing biomass thermal conversion technology and has been garnering much attention worldwide due to its high efficiency and good eco-friendly performance characteristics. Pyrolysis technology provides an opportunity for the conversion of municipal solid wastes, agricultural residues, scrap tires, non-recyclable plastics etc. into clean energy. It offers an attractive way of converting urban wastes into products which can be effectively used for the production of heat, electricity, and chemicals.

2. Hydrometallurgical method:-

This process is majorly used for profitable recycling of metallic fraction. In this method, metal contents are dissolved into leaching solutions such as strong acids and alkalis. This technique is considered to be more flexible and energy-saving hence cost-effective. Widely used leachants are aqua regia, nitric acid, sulfuric acid and cyanide solutions, from the substrate. Electrochemical processing can be done to recover metals, in the case of metallic substrates.

3. Mechanical recycling:-

It is a physical recycling method. In this method, the disassembled samples are first to cut into specific sizes depending upon the milling needs. Then the pieces are put through a milling process resulting in finely pulverized PCB powder. This powder is subjected to eddy current separators that separate the metal by their eddy current characteristics.

4. Air classification method:-

In this method, the separation of dispersed solid particles takes place on the basis of the particle sizes and their density. The principle of separation is based on the fact that the particles suspended in the gas, mostly air, move to different sections under the influence of different forces. Hence they get separated from one another. PCB particles experience drag and gravity force in opposite directions.

5. Magnetic separation method:-

Magnetic separators with low-intensity drum separators are widely used for the recovery of ferromagnetic metals from non-ferrous metals and other non-magnetic wastes [65]. The disadvantage of magnetic separation is an agglomeration of the particles.

Benefits of recycling: -The advantages of this process are the human's ability to recognize and save working and repairable parts, including chips, transistors, RAM, etc. The disadvantage is that the labor is cheapest in countries with the lowest health and safety standards. Recycling raw materials from end-of-life electronics is the most effective solution to the growing e-waste problem. Most electronic devices contain a variety of materials, including metals that can be recovered for future uses. By dismantling and providing reuse possibilities, intact natural resources are conserved and air and water pollution caused by hazardous disposal are avoided. Mobile phones, monitors, CPUs, floppy drives, laptops, keyboards, cables and connecting wires can be re-utilized with the help of the recycling process. It involves dismantling of the electronic device, separation of the parts having hazardous substances like CRT, printed circuit boards etc. and then recovery of the precious metals like copper, gold or lead can be done with the help of the efficient a powerful e-waste recycler. The most crucial thing here is choosing the right kind of recycler that does not break laws and handle the e-waste in an eco-friendly manner.

IV. E-WASTE MANAGEMENT

For the recycling of e-waste, India heavily depends on the unorganized sector as only a handful of organized e-waste recycling facilities are available. Over 95% of the e-waste is treated and processed in the majority of urban slums of the country, where untrained workers carry out the dangerous procedures without personal protective equipment, which are detrimental not only to their health but also to the environment.

V. CONCLUSION

The hazardous nature of e-waste is one of the rapidly growing environmental problems in the world. The ever-increasing amount of e-waste associated with the lack of awareness and appropriate skill is deepening the problem. A large number of workers have involved the crude dismantling of these electronic items for their livelihood and their health is at risk; therefore, there is an urgent need to plan a preventive strategy in relation to health hazards of e-waste handling among these workers in India.

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