A Study On Importance Of Recycling And The Environmental Health Effects Of Waste Management

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KEYWORDS

E-waste, Recycling, Reuse, Health.

ABSTRACT

The study was conducted to analyze the health effects of waste management on environment. For this purpose, a descriptive type of research was conducted with a sample size of 100 respondents which was chosen based on convenient sampling technique. Structured questionnaire was used to collect the data. The data was tabulated and analyzed using percentage analysis and other statistical tools like chi square test, weighted average mean and Friedman rank test. The findings of the study revealed that all the respondents were aware of waste management and the major factor that encourages recycling is that shorter distance for disposal. There is a relationship between containers used for keeping wastes before its disposal and Household disease because of improper waste management.

1. Introduction

Huge amounts of industrial pollutants have been dumped into the environment over the last few decades. The invasion of e-waste, particularly computer garbage, complicates solid waste management, which is already a major problem in India. Electronic waste (e-waste) refers to electronic items manufactured of sophisticated mixtures of plastics, metals, and other materials, such as computers, printers, photocopiers, television sets, mobile phones, and toys. The Indian electronics and IT industry has risen rapidly. This results not just in increased raw material consumption but also in waste generation issues in e-waste. E-waste stands for electronic waste, which is a branch of Waste Electrical and Electronic Equipment (WEEE). The Waste management is defined as the process of actions required to manage the Production of waste and the safe discarding. It deals with all the category of waste which is produced by Industries, agriculture, animals or humans. The Methods of waste management includes

- Recycling
- Reduction
- Re-use
- Recovery

Recycling:

Recycling refers to the process of converting the waste materials into new materials and objects. Recyclable materials include glass, paper, cardboard, metal, plastic, tires, textiles and other such things.

Reduction

Waste reduction, also called as source reduction, the process of utilizing less material and energy in order to reduce waste output and protect natural resources. Waste reduction encompasses more than recycling and includes methods to keep resources from becoming waste before they reach the recycling stage. Reusing products such as plastic and glass containers, choosing more durable products, and using reusable products such as dishrags instead of paper towels all contribute to waste reduction. Donating items ranging from office equipment to eyeglasses and apparel minimizes the overall amount of material manufactured.

RE-USE

Used products or components that are not discarded are reused for the same function for which they were designed. Reusing goods or materials keeps them from becoming waste, which helps to lessen pollution-related environmental damage. Reuse, along with reduce and recycle, is one method of solid waste management. Reusing garbage means that instead of dumping it, we can repurpose it through upcycling or donating.

Recovery

The process of retrieving useful materials or energy from waste is referred to as waste recovery. Recycling, incineration, various thermal treatment plants, chemical-physical and biological treatment, and landfills are some waste recovery options. Waste recovery is part of an integrated strategy to solid waste management that also includes trash reduction, composting, and disposal.

Composition Of E-Waste

It consists of all trash from electronic and electrical appliances that have reached the end of their useful life or they are no longer suited for their original purpose and must be recovered, recycled, or disposed of. Monitors, printers, keyboards, central processing units, typewriters, mobile phones and chargers, remotes, compact discs, headphones, batteries, LCD/Plasma TVs, air conditioners, refrigerators, and other domestic equipment are all included.

Type Of E Waste

The composition of e-waste is diverse and falls under these category

- Hazardous' and 'non-hazardous' categories.
- Ferrous and non-ferrous metals, plastics, glass, wood and plywood, printed circuit boards, concrete, ceramics, rubber and other items. Iron and steel constitute about 50% of the waste.
- Impact on Human Health and Environment

Electronic trash comes in many forms. Computers, photocopiers, printers, faxes, displays, batteries, and mobile phones are all examples of electronic trash. Toxic metals and chemicals can be found in enormous quantities in e-waste. The harmful compounds are used in the creation of electronic goods, electronic waste can cause severe environmental damage. In one form or another, hazardous compounds such as lead, mercury, and hexavalent chromium or the others are present in such waste primarily consisting of Cathode ray tubes (CRTs), Printed board assemblies, Capacitors, Mercury switches and relays, Batteries, Liquid crystal displays (LCDs), Cartridges from photocopying machines, Selenium drums (photocopier) and Electrolytes. Despite widespread ignorance, e-waste contains harmful chemicals such as lead and cadmium in circuit boards. All electronic equipments contain printed circuit boards which are hazardous because of their content of lead (in solder), brominated flame retardants (typically 5-10 % by weight) and antimony oxide, which is also present as a flame retardant (typically 1- 2% by weight).

Review Of Literature:

Angela Flanagan and Anushree Priyadharshini (2021) conducted a study to investigate the behavior of consumer towards the wastage of food in Ireland. For this purpose they analysed the attitudes and quantities of food wastage. Sample size of 2115 was used to collect the data. The collected data was analysed with the help of factor and cluster analysis. It was found that nearly 63% of the consumers are uncaring and 37% are caring. Out of which most of the uncaring customers were young male and among caring customers were mostly female. Nearly 1kg of food is wasted per week. The findings suggest that the attitude of consumers towards food waste has a direct impact on global warming effects.

Irfan Hameed, Idrees Waris and Bibi Zainab (2021) conducted a study on factors influencing the sustainable consumer beahviour regarding the recycling of plastic waste. For this purpose, they used a continuum of the theory and social influence in order to discuss the factors that may possibly lead to

scrubbing the plastic waste in the country. Using purposive sampling, Sample with a size of 353 respondents was used for the study. The collected data was tested with partial least square structural equation. The findings suggested that the attitude of consumer, subjective norms and control of behavior lead to recycling intentions. It also suggests that recycling intention is the true predictor of recycling behavior for wastage in plastic.

Christina Kenny and Anushree Priyadharshini (2021) The study concentrated much on examination of the current Healthcare Waste disposal methods that results in harmful effects on environment which also affects the public health. The findings of the study revealed that there is a heavy reliance on basic and also low tech healthcare waste management disposal techniques. There is a lack of greener HCW employment disposal methods on a large scale due to the factors like cost, access and feasibility. The study also highlighted the global health consequences of healthcare waste disposal methods often differ depending upon the development of the country.

Objectives Of The Study:

1. To measure the level of awareness towards waste management.
2. To analyze the health effects on environment due to waste management.
3. To examine the importance of recycling among the consumers.

Scope Of The Study:

The study was conducted with a view to analyze the importance of recycling and also the health effects of waste management on environment. For this purpose, a sample size was chosen in and around the Chennai city.

2. Methodology

- Descriptive type of research
- Convenient sampling technique was used.
- Sample size of 100 respondents.
- Primary and Secondary data was used.
- Structured Questionnaire and also books, journals and websites.

Tools For Analysis:

1. Percentage Analysis
2. Chi-square analysis
3. Friedman Rank test
4. Weighted average mean

Limitations Of The Study:

- Only respondents in Chennai city was used for the study.
- Results may vary with the biased opinion of respondents.
- Time was the major constraint in collecting the data.
- Sample size was limited to 100 respondents.

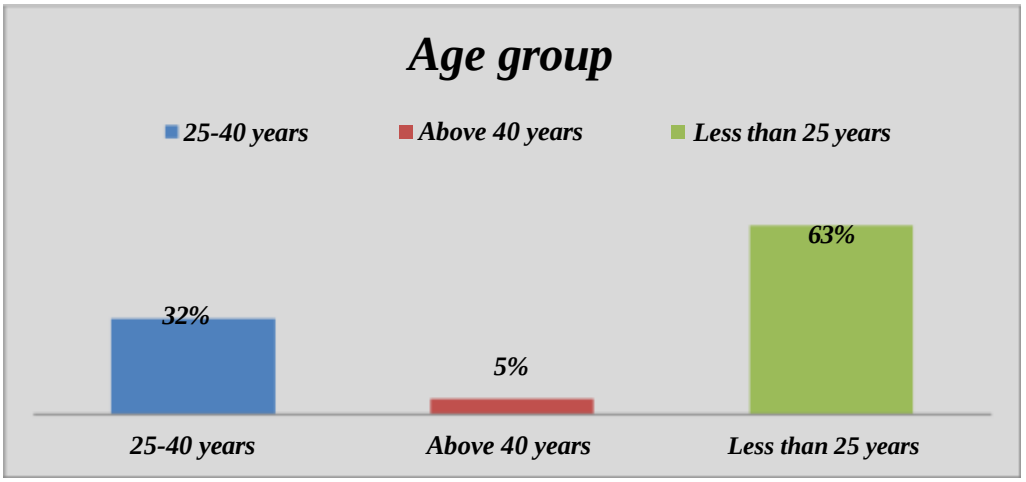
Analysis Of Data

Table No: 1 – Gender

Gender	Frequency	Percent

Female	80	80%
Male	20	20%
Total	**100**	**100%**

From the above table, it is inferred that 80% of the respondents are female and 20% are male. **Chart No: 1 – Age Group**



From the above chart, it is inferred that 63% of the respondents belongs to the age group of less than 25 years, 32% belongs to 25-40 years and 5% above 40 years.

Table No: 2 – Educational Qualification

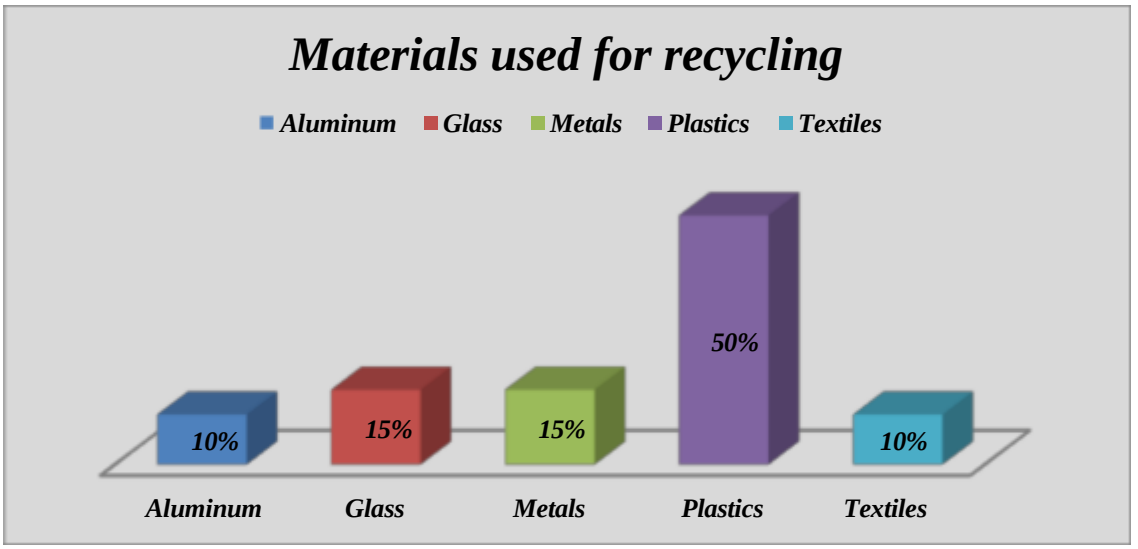
Educational qualification	**Frequency**	**Percent**
UG	15	15%
PG	85	85%
Total	**100**	**100%**

From the above table, it is inferred that 85% of the respondents are Postgraduates and 15% are undergraduates.

Table No: 3 – Awareness On Waste Management

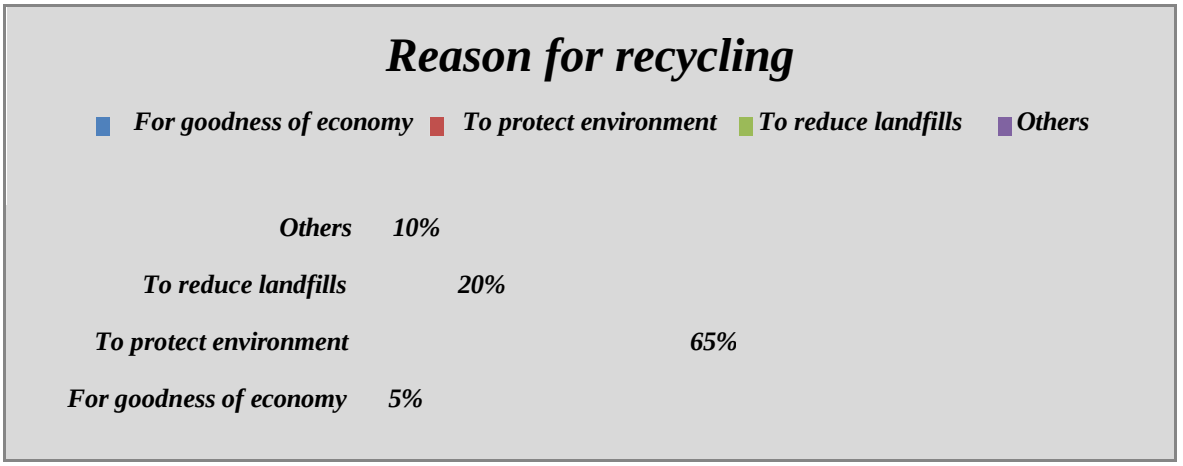
Aware of waste management	**Frequency**	**Percent**
Yes	100	100%
Total	**100**	**100%**

From the above table, it is inferred that all the respondents are aware of waste management. **Chart No: 2– Materials Used For Recycling**



From the above chart, it is inferred that 50% of the respondents use plastic for recycling, 15% each use either glass and metals, 10% each use either aluminum or textiles.

Chart No: 3– Reason For Recycling



From the above chart, it is inferred that 65% of the respondents have stated that the major reason behind recycling is to protect the environment, 20% stated to reduce landfills, 5% for the goodness of economy and 10% of them for other reasons.

Chi square between containers used for keeping wastes before its disposal and Household disease because of improper waste management:

Null Hypothesis (H_0): There is no relationship between containers used for keeping wastes before its disposal and Household disease because of improper waste management

Alternate Hypothesis (H_1): There is a relationship between containers used for keeping wastes before its disposal and Household disease because of improper waste management

Cross tabulation

		Containers used for keeping wastes before its disposal						Total
		Basket	Open plastic galloon	Plastic bucket	Plastic dustbin	Polythene bags	Rice sack	
Household disease	Asthma	0	0	0	5	0	0	5
	Cholera	0	5	0	0	0	0	5

because of improper waste management	**Dengue**	5	0	0	5	5	5	**20**
	Diarrhea	0	0	0	5	20	0	**25**
	Fatigue	0	0	0	5	0	0	**5**
	Malaria	0	0	10	10	15	0	**35**
	Skin irritation	0	0	0	0	0	5	**5**
Total		**5**	**5**	**10**	**30**	**40**	**10**	**100**

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	225.625	30	**0.000**
Likelihood Ratio	141.5583258	30	0.000
N of Valid Cases	100		

Since the Calculated value **(0.000)** is less than 0.05, hence accept **H_1**. There is a relationship between containers used for keeping wastes before its disposal and Household disease because of improper waste management.

Chi square between Area of residence and frequency of falling sick due to environmental issues

Null Hypothesis (H_0): There is no relationship between Area of residence and frequency of falling sick due to environmental issues

Alternate Hypothesis (H_1): There is a relationship between Area of residence and frequency of falling sick due to environmental issues

Cross tabulation

		Frequency of falling sick due to environmental issues						**Total**
		Never	**Once in a month**	**Six months once**	**Three months once**	**Twice in a month**	**Yearly once**	
Area of residence	Rural	5	0	5	5	0	0	**15**
	Semi-urban	5	0	10	0	0	0	**15**
	Urban	20	15	0	15	10	10	**70**
Total		**30**	**15**	**15**	**20**	**10**	**10**	**100**

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	60.119048	10	**0.000**
Likelihood Ratio	70.119067	10	0.000

N of Valid Cases	100		

Since the Calculated value **(0.000)** is less than 0.05, hence accept **H_1**. There is a relationship between Area of residence and frequency of falling sick due to environmental issues.

Friedman Rank Test - Factors That Encourage Recycling

	Mean Rank	**Rank**
Shorter distance	2.63	1
More bins	3.01	2
More promotional activities	3.17	3
More benefits	4.10	5
Clearer guidance	3.73	4
Enforcing laws	4.36	6

Factors that encourage recycling was ranked based on mean values. It was found that shorter distance was the major factor and more bins was the next influential factor that encourages recycling.

Weighted Average Mean – Importance Of Recycling:

Importance	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Total**	**Weighted average**	**Rank**
Recycling is important to have healthy environment	275	100	60	0	0	435	29.00	1.5
It helps to prevent wasteful behaviour	75	280	45	0	0	400	26.67	4.5
Recycling helps in making the world better with utilisation of resources	200	120	60	10	5	395	26.33	6
Recycling is a time consuming process	50	140	105	30	5	330	22.00	8
Recycling involves wastage of time	25	100	60	60	20	265	17.67	10
Consumers can help in contributing to solve the waste	125	180	75	10	0	390	26.00	8

management problem								
Benefits of Recycling proves to be worth of time and money value	150	160	60	20	0	390	26.00	8
Government can concentrate on producers to use recylable materials	175	160	60	0	5	400	26.67	4.5
It is a great help to the environmental protection	200	140	75	0	0	415	27.67	3
Recycling helps in reducing deterioration of environmental quality	225	180	30	0	0	435	29.00	1.5

The importance of recycling was ranked based on the level of agreement of the respondents. It is inferred that it helps in reducing deterioration of environmental quality and Recycling is important to have healthy environment. Hence, both were ranked 1.

Findings:

- 80% of the respondents are female.
- 63% of the respondents belongs to the age group of less than 25 years.
- 85% of the respondents are Postgraduates.
- All the respondents are aware of waste management.
- 50% of the respondents use plastic for recycling.
- 65% of the respondents have stated that the major reason behind recycling is to protect the environment.
- There is a relationship between containers used for keeping wastes before its disposal and Household disease because of improper waste management.
- There is a relationship between Area of residence and frequency of falling sick due to environmental issues.
- It was found that shorter distance was the major factor and more bins was the next influential factor that encourages recycling.
- Recycling helps in reducing deterioration of environmental quality and Recycling is important to have healthy environment

Suggestions:

The government should take necessary steps

- To implement a monetary incentive for segregation activities of wastes
- To implement a penalty towards residents who fail to carry out waste separation
- To implement a combination of monetary incentive and penalties based laws regarding waste separation

3. Conclusion and future scope

Due to development in industrial revolution and other technological advancement, the environment is changing day by day. By changing the quality of the ecosystem the human can be protected from the harmful effects of the pollutants due to improper waste management technique. The survival of human in this world is still a question mark due to the lack of proper waste management system and improper disposal of waste. Because of these, the human health is being affected and diseases are caused. The government has to take necessary measures in order to protect the human as well the environment free from hazardous substances.

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