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## A Study on Impact of Food Packaging Materials and Disposal Practices of Consumer on the Environment

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**Abstract:** Food is a first basic necessity of humans so food safety has always been a matter of concern. Food packaging plays a foremost role in ensuring safety within the food supply. Food packaging has evolved with many variations as the lifestyle of a man has changed. Presently, most commonly used packaging materials are plastic, aluminum, glass and paper and paperboard. With that, the increasing amount of waste from food packaging carries a huge environmental burden. In this context, disposal practices of the consumer hold an utmost importance. The disposal practices of the consumer are not as desirable and satisfactory. As the methods of disposal, people mostly engaged in three common activities like dumping, burning and burying which are associated with many environmental consequences. The rapid growth in food industries and in the use of such materials and their incorrect disposal, is leading to various pollutions,

animal deaths, human health problems which create a chain to affect tremendously our environment. The management of food packaging waste has become a major matter of concern. This paper aimed to measure the impact of food packaging material and disposal practices of consumers on the environment. Therefore, this study will help understand how their daily lifestyle alters their decision on food packaging disposal. The data were collected using a questionnaire and interview schedule. A total of 100 respondents were considered for the present study. This method of sampling technique adopted is stratified random sampling. The findings of the study revealed that consumers are not practicing correct disposal methods even though they are aware of their reserve consequences on the environment.

**Keywords:** packaging material, disposal behaviour, awareness, environment, dumping, burning, burying.

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### Introduction:

Packaging has a salient feature which plays an important role in the food industry where packaging ensures the quality of food products by providing protection from environmental, chemical and physical changes. It is defined in the regulations as all products made of materials of any nature to be used for the containment, protection, handling, delivery and preservation of goods from the producer to consumer.

Food packaging has evolved with many variations as the lifestyle of man has changed. For too long, people only ate what they could gather in their surroundings. As people moved from a nomadic lifestyle to a residential lifestyle, the need for containers for storing food arose. Today, the demand for quality food with convenience in all

terms has increased, which is further dependent on packaging, and it may be a reason for innovations in packaging. Food packaging uses many different types of materials. Most commonly used packaging materials are plastic, aluminum, glass and paper and paperboard (Risch J.S., 2009).



**Fig. 1. Food Products with different packaging**

**Disposal practices:** Disposal practices are any method or treatment given to minimize and discard waste for avoiding health and environmental hazards. Uncontrolled discarding of packaging waste is a problem. Packaging waste that ends up on the street or in open places, contaminates our living environment and can end up in rivers and seas which further directly or indirectly affects the health of the citizen. The disposal practices of the consumer are not as desirable and satisfactory. As the methods of disposal, people mostly engaged in three common activities like dumping, burning and burying which are associated with many environmental consequences. Consumers often have a different perspective on packaging materials than packaging developers or producer industries. Consumers are very quick to view packaging materials as waste items and before thinking twice they are indulged in incorrect ways of disposal. The more convenient it is for consumers to choose such packaging material, the more convenient it is to throw it anywhere (Mohammed N., 2007).

**Environmental Impact:** It is estimated that urban India generates between 1.3 to 1.5 million metric tons of municipal solid waste every day. This adds up to roughly 50 million metric tons per year; at current rates, it will jump to 125 million metric tons in a year by 2031. There is not only increasing in quantity, but the composition of

waste is changing from high percentage of biodegradable waste to non-biodegradable waste. Another estimation is, by 2050, a 50% increase in world food supplies due to increasing global population. As demand for food rises, so does the demand for packaging increases as well (Otto S. and Schmidt M., 2021).

The plastic packaging waste if not collected properly and managed, will add a number of pollutants in nature. The irresponsible and unsystematic dumping of plastic produces highly toxic gases and they are also alleged to contribute about 54 carcinogens to the environment. Also, the environment's 16% chlorine pollutants are accredited to plastic packaging wastes. Metals like tin and aluminum which are used as packaging materials in canning are no less behind. They take 100-500 years to degrade in nature (<https://www.pfionline.com/plastic-food-packaging-waste-management/amp/#>). The rapid growth in food industries and in the use of such materials and their incorrect disposal, is leading to various pollutions, animal deaths, human health problems which create a chain to affect tremendously our environment. Glass can be reused but their manufacturing process emits greenhouse gases, sulfur oxides and nitrogen oxides.



**Fig. 2. Waste Management**

With the increasing amount of waste generated annually, it is becoming more and more challenging for the government to monitor and manage waste disposal throughout the country. Therefore, it is the liability of citizens to not only carry out safe and eco-friendly waste disposal practices but to inspire others to do the same. It should be the responsibility of producer as well as consumer that the management of packaging material and aims to minimize the effect of the

packaging wastes on the environment by reducing the amount going to landfill should be contemplated. Consumers can make a system for return, collection and recovery and recycling of waste. The concept 3R's – reduce, reuse and recycle can be helpful in cutting down on the amount of waste we throw away, especially in case of packaging waste. As far as packaging is essential for food safety, in the same way its controlled use is essential for the environment ([https://foodprint.org/issues/the-environmental-ima](https://foodprint.org/issues/the-environmental-impact-of-food-packaging) pct-of-food-packaging)

#### **Problem of the study:**

With the advent of technologies and growth in food industries, there is a rapid increase in use of various types of packaging materials. This increase in the number of food packaging materials generates a lot of packaging waste which leads to an adverse effect on the environment. The less knowledge of the consumer, their incorrect disposal practices and awareness regarding disposal instructions given on food packages is the primary cause of environmental pollution. Irregularity of disposal practices is one of the major causes of environmental pollution. The widespread usage of these packaging materials has resulted in a heavy burden on the environment.

#### **Purpose of the study:**

Despite all the government schemes and policies, and the efforts of government and non-government agencies, the condition of the environment is not improving. Food is an integrated part of human life so the waste created by food packaging materials will be always in such large quantities. Meanwhile, the management of food packaging waste has become a major source of concern. This present study will be carried out to help fill the knowledge gap. The main aim of the study will be to assess the different materials used for food packaging, their disposal practices by the consumer, their environmental effects, and the management of packaging waste. The findings may be helpful to make people aware for determining the various waste management options for the different types of food packages at household to commercial level.

#### **Objectives:**

- To assess the types of material used in packaging of food products.
- To find out the impact of disposal practices of food packaging material on the environment.
- To measure the knowledge level of consumer concerning the management of the food packaging waste.

#### **Hypothesis:**

- The disposal practices of consumer are not satisfactory as concerned for the environment.

#### **Methodology:**

The step-by-step procedure adopted to carry out the investigation is presented in this chapter. It also explains the various tools of research followed to achieve the objectives of this study. In this paper basic packaging materials plastic, glass, metal and paper/paperboard were chosen.

**Research Design:** - This was a community based cross-sectional study.

**Area of the study:** Respondents from given areas of Patna were taken: -

- ❖ Boring Road
- ❖ Srikrishna Nagar
- ❖ Kidwaipuri

**Sample Size:** 100 respondents were selected.

**Research tools:** Survey cum interview was used for the study. A structured questionnaire was developed related to the objectives of the study.

**Data analysis technique:** Tabulation and frequency distribution method will be taken for the data analysis.

#### **Result and Discussion:**

The chapter deals with the complications of the findings of the study. The results obtained during the course of investigation were subjected to suitable statistical analysis, tabulated and systematically presented through classified and supportive material.

#### **Major findings:**

**Table 1: General Characteristics of the participants (n=100)**

Particulars	Number	Percentage (%)
<b>Age</b>		
20-30	14	14
30-40	48	48
40-50	38	38
<b>Education</b>		
Matriculation	13	13
Intermediate	19	19
Graduate	48	48
Post Graduate	12	12
Ph.D.	08	08
<b>Knowledge regarding different types of food packaging material</b>		
Yes	94	94
No	06	06
<b>Preference while purchasing food</b>		
With Packaging	86	86
Without packaging	04	04
<b>Frequency of buying packaged food</b>		
Daily	24	24
Weekly	50	50
Monthly	26	26

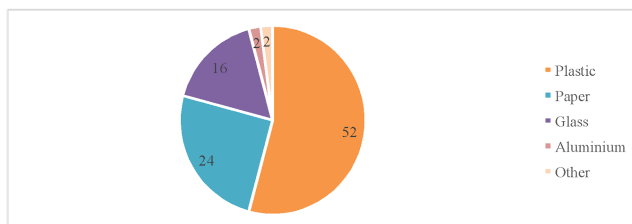
The above table shows the general characteristics of the participants. The age, education level, knowledge regarding different types of packaging material, preferences while purchasing food and the frequency of buying are the criteria of identifying their characteristics. The majority (48%) of the participants were in the age group of 30-40 years, whereas 38% of the participants were from 40-50 years. When classified on the basis of their education, most of them (48%) were graduates.

Based on the findings 94 per cent had knowledge regarding types of packaging material and also found that 86 per cent of the respondents purchased food products with packaging. The frequency of buying packaged food by the consumer was 24 per cent on daily basis and 50 per cent of them were used to weekly purchasing of packaged food.

**Objective 1: To assess the types of material used in packaging of food products.**

**Table 2. Most preferred packaging material**

S. No.	Particulars	Number	Percentage (%)
1.	Plastic	52	52
2.	Paper	24	24
3.	Glass	16	16
4.	Aluminum	02	02
5.	Other	02	02
	Total	100	100

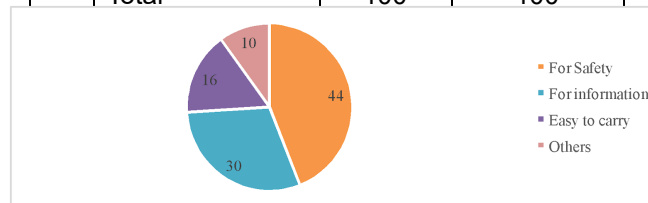


**Fig. 3. Most preferred packaging material**

From the above given figure, it is quite clear that the majority (52%) of the respondents preferred plastic over other packaging materials. Several studies investigate that plastic is a major contributor in creating pollution and thereby affects the environment.

**Table 3: Reasons for preferring food products with packaging**

S. No	Particulars	Number	Percentage (%)
1.	For Safety	44	44
2.	For information	30	30
3.	Easy to carry	16	16
4.	Others	10	10
	Total	100	100



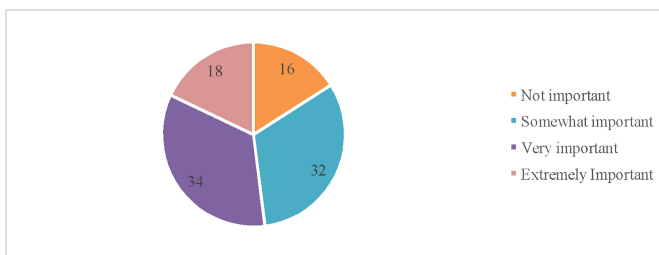
**with packaging**

Based on the findings the reasons for preferring food products with packaging were for safety, information and ease in carrying. Most of them (44%) preferred safety, 30% for information, 16% for ease in carrying whereas 10% preferred for other reasons.

**Objective 2: To find out the impact of disposal practices of food packaging material on the environment.**

**Table 4. Importance of packaging in food purchasing decision**

S. No.	Particular	Number	Percentage (%)
1.	Not important	16	16
2.	Somewhat important	32	32
3.	Very important	34	34
4.	Extremely Important	18	18
	Total	100	100

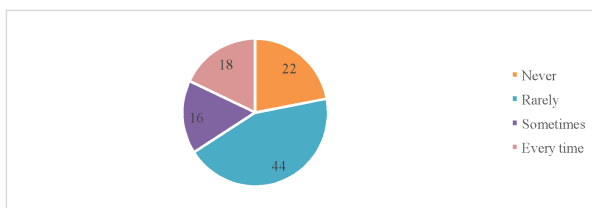


**Fig. 5. Importance of packaging in food purchasing decision**

The figure shows that very few of them (16%) had no importance of packaging in their food purchasing decision and 34% of them agreed that the packaging has a very important role at time of buying whereas 32% agreed for somewhat important and 18% agreed for extremely important.

**Table 5. Consumer's reading habit regarding disposal labels on food packaging**

S. No.	Particulars	Number	Percentage (%)
1.	Never	22	22
2.	Rarely	44	44
3.	Sometimes	16	16
4.	Every time	18	18
	Total	100	100

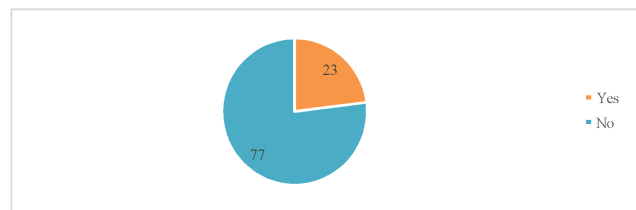


**Fig. 6. Consumer's reading habit regarding disposal labels on food packaging**

When classified based on the consumer's reading habit regarding disposal labels or instructions on food packaging, majority of them (44%) rarely saw disposal instructions, 22% of them never had a habit to read it, 16% of them read it sometimes whereas 18% of them had a habit to read every time.

**Table 6. Disposal of packaging material according to labels/instructions**

S. No.	Particulars	Number	Percentage (%)
1.	Yes	23	23
2.	No	77	77
	Total	100	100

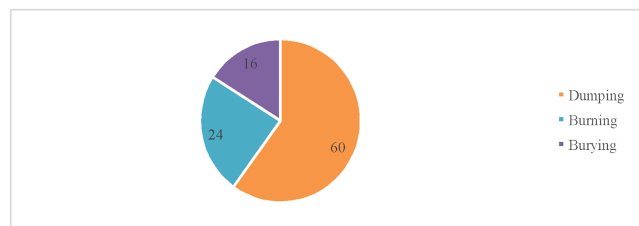


**Fig. 7. Disposal of packaging material according to labels/instructions**

From the above table it is quite clear that, most of them (77%) had not disposed the packaging material according to labels whereas few of them (23%) used to dispose it accordingly.

**Table 7. Methods adopted for disposal of packaging material.**

S. No.	Particulars	Number	Percentage (%)
1.	Dumping	60	60
2.	Burning	24	24
3.	Burying	16	16
	Total	100	100

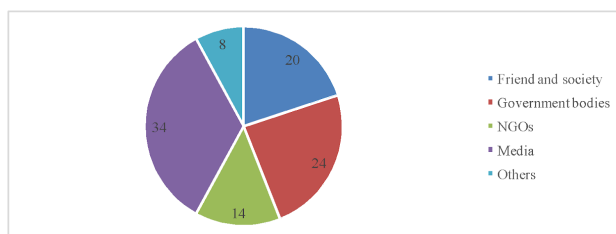


**Fig. 8. Methods adopted for disposal of packaging material.**

In the study 60 per cent of the participants adopted dumping methods for disposal of packaging material and 16 per cent buried it whereas 24 per cent adopted burning method.

**Table 8. Factors influencing their disposal behaviour**

S. No.	Particulars	Number	Percentage (%)
1.	Friend and society	20	20
2.	Government bodies	24	24
3.	NGOs	14	14
4.	Media	34	34
5.	Others	08	08
	Total	100	100



**Fig. 9. Factors influencing their disposal behaviour**

It was seen that the factors influencing their disposal behaviour was 34% by media followed by government bodies (24%), friend and society (20%) and by other sources (08%).

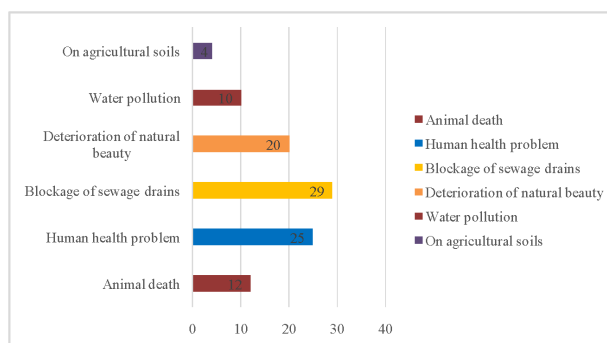
**Table 9. Consequences of incorrect disposal of food packaging waste in their locality or nearby places**

S. No.	Particulars	Number	Percentage (%)
1.	Yes	78	78
2.	No	22	22
	Total	100	100

The above given figure represents that 78 percent of the respondents saw the consequences of incorrect disposal of food packaging waste in their locality or nearby places whereas 22 per cent were still unaware.

**Table 10. Major consequences seen by them**

S. No.	Particulars	Number	Percentage (%)
1.	Animal death	12	12
2.	Human health problem	25	25
3.	Blockage of sewage drains	29	29
4.	Deterioration of natural beauty	20	20
5.	Water pollution	10	10
6.	On agricultural soils	04	04
	Total	100	100



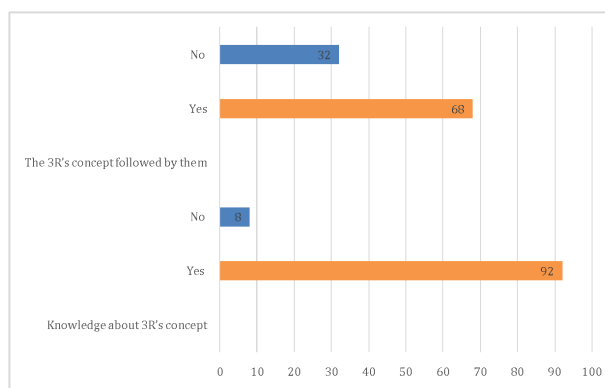
**Fig. 10. Major consequences seen by them**

From the above given figure, it was clear that the major consequences seen by them was 29 per cent from blockage of sewage drains followed by (25%) of human health problems, (20%) deterioration of natural beauty, (12%) animal death, (10%) water pollution whereas (04%) on agricultural soil.

**Objective 3: To measure the knowledge level of consumers concerning the management of the food packaging waste.**

**Table 11. Application of 3R's**

Particulars	Numbers	Percentage (%)
<b>Knowledge about 3R's concept</b>		
Yes	92	92
No	08	08
<b>The 3R's concept followed by them</b>		
Yes	68	68
No	32	32



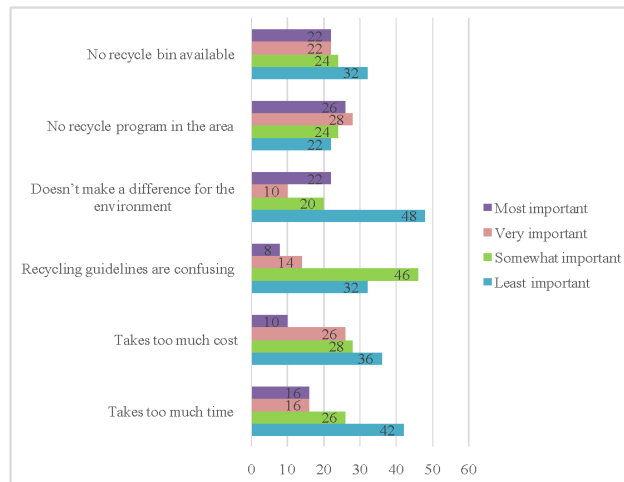
**Fig. 11. Application of 3R's**

Fig. 11, indicates to measure the knowledge level of consumer concerning the management of the food packaging waste. It was seen that 92 per cent of the respondents have knowledge about 3R'S concept whereas 08 per cent were unaware about it. The study shows that 68 per cent

followed the concept of 3R'S whereas 32 per cent rarely followed it.

**Table 12. Reasons for not to recycle**

Reasons	Least important (%)	Somewhat important (%)	Very important (%)	Most important (%)
Takes too much time	42	26	16	16
Takes too much cost	36	28	26	10
Recycling guidelines are confusing	32	46	14	8
Doesn't make a difference for the environment	48	20	10	22
No recycle program in the area	22	24	28	26
No recycle bin available	32	24	22	22



**Fig. 12. Reasons for not to recycle**

The figure states the attitude of the respondents and their reasons for not to recycle. The figure indicates that 26 per cent of the participants saw no recycle program in the area followed by no recycle bin available 22 per cent. The finding also shows that 22 per cent of the candidate reason for not to recycle was it doesn't make a difference for the environment whereas 16 per cent of the respondents famed that it takes too much time.

**Conclusion:**

In this study, efforts were made to find out the impact of food packaging materials and disposal practices of consumer on the environment. The following conclusions are drawn on the basis of the analysis of the study.

- The study clearly indicates that the types of packaging material used in food products with respect to preferences, the reason for preference and the knowledge about different packaging material. The most preferred material was plastic due to cheaper and mostly offered by the retailers or sellers.
- Most of them preferred food product with packaging for safety, information and for the reason of easiness in carrying.
- Most of the respondents stated that they do not make any special choice or demand for the product with eco-friendly packaging material, they select it only when it is available at the same price or at the price with very lower difference.
- Very few were aware of that the packages come with food product contains the instruction to dispose of it properly and due to this reason, they were not considerate and thus they used to indulge in the incorrect disposal practices.
- They also stated about the factors which influences their behaviour or attitude. Media, the government bodies and the friends and society were the most influenceable factors.
- Another important aspect which came forward that the impact of their incorrect disposal practices on the environment. Most of them agreed that they felt the presence of consequences around themselves.
- The major consequences noticed were blockage of sewage drains and human health problem. Although all the consequences are associated with each other like blockage of sewage drains can cause infectious diseases and therefore raises human health problems. Other impacts stated by them were deterioration of natural beauty, animal death and water pollution.
- From this study it is clear that the majority were aware of the concept of - reduce, reuse and recycle (3R's) but despite having knowledge, they were not following the concept.
- They stated the considerable reason for not taking recycle as a management tool. For this, they found that there were no recycle program in the area and

unavailability of recycle bin. Some of them felt recycling takes too much time and is a costly process.

### **Suggestions:**

Based on the conclusions the following suggestions were formulated.

1. Use packaging materials that are either reusable or recyclable. One can reuse the materials for various purposes such as using glass containers to store ingredients used in the kitchen. This helps in reducing waste and preventing the unnecessary purchase of products.
2. Shop from local farmer markets and buy in bulk to reduce packaging wastes.
3. Avoid single use food and drink containers and utensils.
4. Separate dry and wet waste that may reduce pollution.
5. Buy the largest container available, single serving sizes take more packaging and thus contribute to increasing amount of packaging wastes.
6. Plastic, paper, glass and metal have been commonly used for many years, similarly environment friendly material should also be generalized so that the consumer can choose it without thinking twice about price. Although it can be only practiced by producers, retailers and then by consumers.
7. City council should have an important role in management. They should provide

complete guidance, formulate recycle programs in the area and keep the records of activities.

8. As households are more frequently used to the food products which come with packaging, the women should be aware of the consequences of the incorrect disposal practices and the methods to prevent the degradation of the environment.

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