EVALUATION OF PLASTIC LABELLING IN REGULAR USE PLASTIC ITEMS

QUAID-I-AZAM UNIVERSITY

ISLAMABAD

Bachelor of Science

in

Environmental Science

by

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DEPARTMENT OF ENVIRONMENTAL SCIENCES

FACULTY OF BIOLOGICAL SCIENCES

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Hafiz Ahmad Abdullah
Dated: 24ᵗʰAugust2020

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It is to certify that the research work presented in this thesis, entitled **"Evaluation of Plastic Labelling in Regular Use Plastic items"** was conducted by **Hafiz Ahmad Abdullah (Reg. No. 04311613029)** under the supervision of **Prof. Dr. Riffat Naseem Malik.** No part of this thesis has been submitted else for any other degree. This thesis is submitted to the **Department of Environmental Sciences**, in the partial fulfillment of the requirements for the degree of **Bachelor of Science** in the field of Environmental Science, Department of **Environmental Sciences**, Quaid-i-Azam University Islamabad, Pakistan.

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TO

MY BELOVED

FATHER AND MOTHER

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List of Abbreviations

Abbreviations	Word
BPF	British Plastic Federation
SPI	Society of the Plastics Industry
PET	Polyethylene Terephthalate
HDP	High-Density Polyethylene
PVC	Polyvinyl Chloride
PP	Polypropylene
PS	Polystyrene or Styrofoam
ABS	Acrylonitrile Butadiene Styrene
PLA	Polylactide
PMMA	Polymethyl Methacrylate
PUR/PU	Polyurethane
PC	Polycarbonate
BPA	Bisphenol A
EPA	Environmental Protection Agency

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Abstract

Background: Labelling of plastic packaging is crucial, either to sort out different plastic products for recycling or check its impacts associated with public health.

Objectives: Objective of this study, to evaluate the status of labeling on the packaging of those products, which we use and discard on our daily basis.

Methods: This study is based on evaluation of plastic labeling on the packaging materials of edibles, detergents, and cosmetics available in local shops. A total 150 products of edibles, detergents and cosmetics belonging to three major categories were evaluated, 50 samples for each subcategory.

Results: Results have shown, only 20% of edibles packaging was labelled, and 42% of detergents packaging. Packaging of cosmetics items were 38% labelled. Shop keepers were unaware of plastic labelling but appreciated plastic labelling.

Conclusions: For the better management of plastic waste there should be such policies and legislations that make it compulsory for plastic manufacturers to label the type of plastic. Labelling of plastic type on each plastic packaging is suitable option to aware public about the required mode of plastic disposal. In brief, our outcomes indicate that the more than half of the evaluated items were not labelled. i.e.57%.

Chapter 1

1.1 Introduction

Plastic is produced from the range of synthetic and semi-synthetic organic compounds. About 4% of fossil-fuel extracted annually is presently used as raw materials for plastic production (British Plastics Federation, 2008). natural gas liquid fraction or low-value gaseous fraction from the refined petroleum is mostly used for plastic production. Plastic is used in the production of several products that everyone utilizes and discards on regular basis (Buekens & Huang, 1998). Plastic is important for production of secondary products, because of its unique properties. Its versatile, light in weight, cheap and easily available in different types, it is also very important element for the food preservation. Now a day's maximum food items are stored and transported in plastic packets (Taylor, 2009). Because of its high resistivity towards the degradation it accumulates into the environment. Use of plastics started only about 100 years back and did not get a lot of attention until after World War 1, when they proved to be highly economical alternatives to metal, wood and glass. In1950 the world produced only 2 million tonnes plastic per year and in 2015 the total annual production had increased nearly two hundred times and reached the 381 million tonnes. Current statistics for Western Europe estimated that the annual total consumption of plastic products at 48.8 million tonnes for 2003 equaling to 98kg/capita and this was approximately 64 kg/capita a decade before i.e. in 1993 (Achilias et al., 2007).The production of plastic from 1950 to 2015 had reached 7.8 billion tones. Global plastic production was an estimated 299 million tons in 2013, it is 3.9% increase from 2012. There are different sectors of plastic use among which Packing is the (single use plastic/disposable items) most common and this sector globally accounts for 42% (146 million tons) in 2016 (Figure 1.1; primary plastic production by industrial sector 2015).
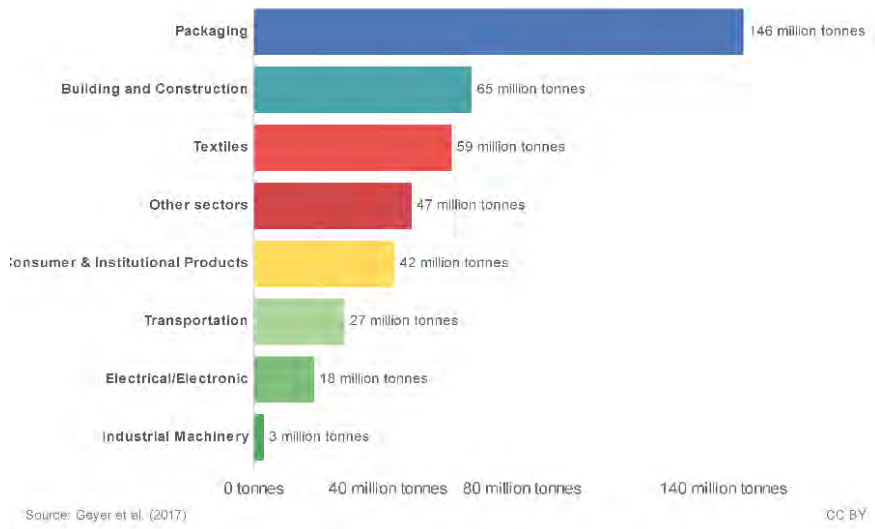
Figure1.1 Primary Plastic production by industrial sector 2015

It is reported that 8.3 billion metric tonnes of plastic has been produced in the 65 years after the 1950s. it is the decade in which mass production of plastics began and about 60% of that i.e. 4.9 billion tonnes had disposed of in landfills that severely polluted the environment (Wallace, 2017). There are specified locations in the world where the plastic waste exists in concentrated form and known as hotspots of the plastic which includes the Beaches, coastal areas, dumping sites, and oceanic gyres. persistent plastic waste is known as the major oceanic pollution (Laist, 1987). because of the concentrated form of waste plastic, these sites are suitable for studying plastic pollution to solve the problem. research on plastic pollution is of high worth, because the magnitude of plastic waste is increasing day by day while the recycling is very rare in existing era. This may be fatal for the future generations if remained unsolved. So modern recycling technologies are required for the recycling of plastic to minimize the burden of waste plastic on environment (Jain, 2017). To recycle the plastic the initial requirement is the collection of information about different polymers from which different types of plastic are made and classified into different categories, making it easier to dispose of or segregate the plastic for the recycling purposes in accordance with labelled plastic type. For this sake, the study was conducted to analyze the different plastic packaging that majorly contains the daily life products. Plastic is not a simple thing as we think. Each type of plastic is different from the others. Some types are reusable, and some produce hazardous material after several uses. Some are easily recyclable, while others need more sophisticated and difficult handlings in its recycling process (Ross & Evans, 2003).

Take your nearest plastic product it maybe the lunch box or water bottle. Study closely, and you may find a number at its back or bottom. This number indicates the type of plastic used to make the product you are holding. But do you know exactly what number you should avoid and what number has the highest chance to damage the environment, In this regard the Society of the Plastics Industry (SPI) created a classification system making it easier to sort and dispose of different kinds of plastics in accordance with their coding system and their codes are known as SPI codes, with a "chasing arrow symbol" which may be molded or imprinted into the bottom of plastic products. (ttp). According to SPI the plastics are classified into seven categories whose details are written below.

PET or PETE stands for "Polyethylene Terephthalate". it is made from monomers of branched structure ethylene. This is the most common type of plastic, produced and discarded on maximum quantity (Royer et al., 2018), and it is also easily recyclable. its major uses include the household containers such as carbonated beverage bottles, microwavable food trays, peanut butter jars, medicine bottles, hair combs, and rope. After the recycling it is commonly found in carpets, fiberfill of coats, sleeping bags, cassette tapes and sails for boats. In labs, this is primarily used for storage and dispensing bottles (Achilias et al., 2007). PET is most suitable for recycling programs; this type of plastic contains antimony trioxide which is a matter that is considered as a carcinogen and it can cause cancer in a living tissue. The longer a liquid is left in a PET container the greater the potential for the release of the antimony. Warm temperatures inside cars, garages, and enclosed storage could also increase the release of the hazardous matter.

HDPE stands for the "High-Density Polyethylene". Ethylene is a monomer that is used to make the polymer polyethylene and it is a denser form of polyethylene with linear structure of polyethylene to make HDPE. Many packaging items use this as a moisture barrier and for its chemical resistance.it is more safer than PET, because the products made of HDPE will not transmit chemicals into food or drinks so they are typically used in snack food packages, cereal box liners, milk, margarine and whipped topping containers. It is also used for shampoo, detergent and bleach bottles, motor oil and even in the toys. after recycling, HDPE is used for plastic lumber, fencing, and storage crates (Achilias et al., 2007).

Besides that it is recyclable, HDPE is relatively more stable than PET so it is considered as a safer option for food and drinks packaging, but some studies have shown that it can leach

estrogen-mimicking additive chemicals that could disrupt human's hormonal system when exposed to ultraviolet light.

PVC stands for the "Polyvinyl Chloride". It is the second largest production of thermoplastic by volume and very commonly use for the manufacturing of plumbing pipes (Janajreh et al., 2015). floor coverings and house siding, but is also found in synthetic leather products, shower curtains, car dashboards and cable and wire sheathing. Because of its ability to resist most chemicals and bacteria, it is also used in blood bags and medical tubing. Automobile dashboard ventilation controls or buttons are also made up of this type of plastic. In the term of toxicity, PVC is the most hazardous plastic. Its use can leach several types of toxic substances such as bisphenol A (BPA), phthalates, lead, dioxins, mercury, and cadmium. these chemicals can cause cancer; it could also cause allergic symptoms in children and interrupt with the human's hormonal system. PVC is hardly accepted by recycling programs. So, the best option for PVC is to be avoided.

LDPE: stands for the "Low Density Polyethylene". It is the durable and flexible plastic and its special characteristics includes the transparency and toughness, that is often used for sandwich bags, cling wrap, squeeze bottles, grocery bags and dry-cleaning bags. It is also used in wire and cable applications because it has stable electrical qualities. It is not suitable for recycling, but it can be used in the dust bins, garbage cans, and furniture (Van Willige et al., 2002). Just like the PE products, this is also used in lab bottles, specifically for the narrow necks such as wash and dropper bottles. Although some studies have shown that LDPE could also cause unhealthy hormonal effects in humans but still LDPE is considered as a safer plastic option for food and drink use. But Unfortunately, this type of plastic is very difficult to be recycled (Achilias et al., 2007).

PP stands for the "Polypropylene". These are the films that has the high chemical resistance, and it is very common for both solid and flexible packaging. It is high heat resistive and can handle higher temperatures hence it is suitable for filling hot liquids such as pancake syrup. It may poorly penetrate air and for that we use aluminum foil to avoid moisture intake (Van Willige et al., 2002).It is used for food storage containers, ketchup bottles, diapers, prescription bottles and yogurt containers, and plastic bottle caps. It is also found in automotive battery casings. After the recycling it is commonly used in rakes, battery cables or ice scrapers. Because of its wide service temperature range, it is the most common plastic that is used in laboratory test tubes, vials, bottles,

jars, racks, and microplates. Same as LDPE, PP is considered a safer plastic option for food and drink use. PP is not quite recyclable and could also cause asthma and hormone disruption in human.

PS stands for "Polystyrene or Styrofoam". it is a synthetic aromatic hydrocarbon polymer, made up from the styrene monomer. It adversely harms the environment and it can be replaced with Husk which is biologically degradable (Series, 2020). Polystyrene can be solid or foamed. This plastic can be used in either rigid or foam format. Because of its clarity it is best for medical and laboratory specimen containers i.e. culture tubes, Petri dishes, pipettes, wells, and microplates. It is popular in food packaging and plastic cutlery. It can be transformed into expandable foam so it can be easily shaped into disposable coffee cups, meat, fish and cheese trays and restaurant take-out boxes. It is also famous for packaging foam. After the recycling it is used in insulation, rulers, and license plate frames. When Styrofoam is exposed to hot and oily food, it could leach styrene that is considered as brain and nervous system toxicant, it could also affect genes, lungs, liver, and immune system. On top of that risks the PS has a low recycling rate.

Rest of plastic types are included into OTHER; it is the last category of plastic that covers all other plastics except the above six types. And it also includes the plastics that may be layered or mixed with other types of plastics, such as bioplastics. Polycarbonate (PC) is the most common plastic in this category. it is not used as much in recent years due to its association with bisphenol A. PC is also known by Lexan, Makrolon, and Makro clear. PC is typically used for baby bottles, sippy cups, water bottles, water gallon, metal food can liner, ketchup container, and dental sealants. Because of its toxicity, several countries have banned the use of PC for baby bottles and infant feeding products packaging (Bahraini, 2018).

The BPA that contained inside PC have been linked to numerous health problems including chromosome damage in female ovaries, decreased sperm production in males, early onset of puberty, various behavioral changes, altered immune function, sex reversal in frogs, impaired brain and neurological functions, cardiovascular system damage, adult-onset Type II diabetes, obesity, resistance to chemotherapy, increased risk of breast cancer, prostate cancer, infertility, and metabolic disorders. Added with its very low recycle rate quality, PC should also be avoided at all cost (Taylor, 2009). Few other examples that includes in the type "OTHER" are written below.

Nylon was originally developed as synthetic alternative for silk stockings and is now found in many fabrics and carpet. As a solid it is used in mechanical parts where the level of stress is low

to medium like screws and gears. It is also used as a reinforcing agent in composite materials for car components. Other applications include hair combs and toothbrushes.(Kim et al., 2001) Acrylonitrile Butadiene Styrene (ABS), it is known for its strength and rigidity and used in musical instruments, golf club heads, automotive trim and bumpers, luggage, and small kitchen appliances. Polylactide (PLA) is made from renewable resources like corn starch, tapioca, and sugarcane so it is used in disposable cups and biodegradable packaging, compost bags, disposable tableware, and non-woven textiles for upholstery, garments, and diapers. Polyester: it is popular in knit fabrics, pillows, tarps, bottles, and insulating tapes. It can also be found as finishes on wood products like guitars and pianos. Polymethyl Methacrylate (PMMA) it is an acrylic "glass" commonly sold under trade names such as Plexiglas and Lucite. Safety glasses are made from PMMA. Polyurethane (PUR) is used in foam seating, insulation panels, Spandex clothing, seals gaskets, hoses, and skateboard wheels. It is difficult to recycle but PUR can be reused for lumber alternatives. Polytetrafluoroethylene, commonly known as Teflon and it is used in cookware, waterproof coating, plumbing tape and tubing due to its strong, heat-resistant, frictionless surface. It is also used in lab centrifuge tubes (Royer et al, 2018).

Figure 1.2 Symbols and codes of seven plastic types

The well recognized categories of plastic include the most, which have association with serious health issues and some types are suitable for recycling. For the general public these information does not have direct access and to aware the public there should be general trend of labelling on each product of plastic, so everyone can observe the label and further he can get information about that type of plastic that how much is it dangerous for health. Different governments are also playing role in this regard. Pakistan Environmental Protection Agency (EPA) has banned the production and usage of polythene bags in the federal territory (Gov, 2019).

1.2 Problem Statement

Labelling of the plastic type on the plastic items are very important and every plastic producer does not label it on the products, so it is very difficult to segregate the plastics for recycling purposes. There is need to sort out the items that how many domestic items are labeled or not. Find out whether the plastic is recyclable or not, So the recyclable plastic should segregate for recycling industry and the non-recyclable plastic should control from its source. Further the mentioning of plastic type on a plastic item can also reduce the cost of preprocessing if the type is not recyclable. Without labelling no one can realize how much this plastic type can be hazardous for health or how much it can pollute environment.

Pakistan, as a developing country is already facing a lot of environmental and health problems, among others the plastic pollution is vibrant issue that is badly impacting the environment of Pakistan, specifically the aquatic life. Improper management of waste plastic is one of the major causes of plastic pollution. Because of it the environmental quality of Pakistan is decreasing day by day, everywhere in the streets and homes we are facing plastic waste, because no one knows where and how to discard plastic. Most people discard it with house waste, that eventually goes to the water bodies or in some cases to the landfills, but that is not the proper way. Different types of wastes should be segregated, and recyclable plastic should transport to the recyclers to reduce the plastic pollution by utilizing the existing plastic. Labelling of the plastic type is essential for the proper recycling process.

There are some international brands that labels the plastic properly, i.e. Unilever, but it should also consider important at national level.

Legislations should be generated for the compulsory labelling as few months back the law for ban on use of polyethylene bags were imposed in Islamabad.

1.4 Objectives

The following study was intended to

- To evaluate the labelling of plastic type on the packaging of regular use household items.
- To assess the shopkeepers understanding and response about labelling.
- Comparison of plastic labelling and manufacturing brand.

Chapter 2: Materials and Methods

This study was conducted by the analysis of plastic labelling on the packaging of the regularly used household items. Local shops were visited and items that have maximum usage in our daily life, were selected to analyze labelling status.

Field work begun with the permission letter signed by respected supervisor for the approval of entrance at shops and grant of permission for capturing the photographs of required items.

2.1 Study Area

All the surveys were conducted from the local shops of Westridge 2 Rawalpindi city.

2.2 Interviews

Before surveying the items for plastic labelling, shopkeepers and shop honors were interviewed about their knowledge for the labelling of plastic types.

Proper guidance was given to each shopkeeper and then their reaction was also analyzed

2.3 Survey

For the analysis of plastic labelling, local shops were surveyed. From the crowded shops, only photograph of each item was captured on spot and labelling was evaluated at home and data inserted into excel sheets. But shop having less crowd, on the spot items were analyzed and data directly entered to the excel sheet. For the proof photographs were also captured.

2.4 Classification

Surveyed items were classified into three major categories.

1. Edibles
2. Detergents
3. Cosmetics

Followed up with five subcategories from each major category. i.e. edible is a major category and its subcategories are biscuits, snacks, preserved milk, juices, and cooking oils (Table 2.1).

- Selection of items were based on its packing material type. i.e. that includes plastic.
- Selection of the brands were based on its market availability.
- All the items were analyzed from local cosmetics and grocery shops.

Table2.1 Names of evaluated items fall under edible subcategory

	Edibles Subcategory				
	Biscuits	**Snacks**	**Preserved Milk**	**Juices**	**Cooking Oils**
1	Sooper	Lays	Milk Pak	Gourmet Cola	Sufi Canola
2	Prince	Kurkure	Olpers	Mountain Dew	Dalda Cooking Oil
3	Rio	Salanty	Dairy Pure	Seven up	Season Canola
4	Party	Wavy	Qudrat	Pepsi	Kashmir Vegetable Oil
5	Marie	Peanuts Salted	Cup Shup	Bigapple	Kisan Cooking Oil
6	Candi	Catty Chins	Tarang	Fruitien	Habib Soybean Oil
7	Chocolate Chip	Kurlees	Every Day	Jam-E-Shirin	Eva Cooking Oil
8	Gala	Cheetos	Haleeb	Roohafza	Mezan Canola
9	Digestive	Potato Sticks	Nurpur	Fruiticana Fruit Drink	Bores Olive Oil
10	Butter puff	Super Crisp BBQ Crinkled	Nesvita	Slice Mango	Handi Cooking Oil 1 Litre

Detergents have the subcategories of body soaps, shampoo, laundry items, toothpastes, and other detergents (Table 2.2).

Table2.2 Names of evaluated items in detergent subcategory

	Detergents Subcategory				
	Body Soaps	**Shampoos**	**Laundry Items**	**Toothpastes**	**Other Detergents**
1	Safeguard Floral Scent	Head & Shoulder	Ariel Surf	Closeup Deep Action	Power Plus Glass and Household Cleaner
2	Palmolive Hydrating	Sunsilk	Surf Excel	Doctor with Fluoride	Harpic Toilet Cleaner
3	Fair & Lovely Soap	Clear	Bonus Active	Colgate Sensitive	Vim Dish Wash Gel
4	Dettol Orignal	Pantene	Express Power	Medicam Dental Cream	Dettol Multi Surface Cleaner
5	Lifebuoy	L'oreal	Bego Washing Powder	Parodontax Extra Fresh	Lemon Max Dishwash Liquid

6	Classic Beauty Soap	Dove	Brite Maximum Power	Sensodyne	Lemon Max Dishwashing Paste
7	Lux Purple Lotus	Vatika	Sufi Soap Vermicelli	Sparkle Fuoride Toothpaste	Domex Toilet Expert
8	Lux Green	Bioamla	Surf Excel Matic	Aquafresh Al In One Protection	Safeguard Antibacterial Hand Wash
9	Capri Moisturizing	Samsol	Robin Bleach	Forhan's Triclosan Free	Tyfon Total Control Insect Killer
10	Savannah Classic	Lifebuoy	Gaye Soap	English Fluoride Toothpaste	Lifebuoy Hand Sanitizer Gel

Cosmetics is a major category that includes the face wash, body lotions, hair colors, oils and jells, and lipsticks (Table2.3).

Table2.3 Names of evaluated items in cosmetics subcategory

	Cosmetics Subcategory				
	Face Wash	Hair Color	Oil and Jels	Body Lotions	Lipsticks
1	Ponds Pimple Clear	Olivia Hair Color	Aloe Vera Soothing Gel	Johnsons's Baby Lotion	Miss Green 10
2	Fair and Lovely	Black Rose Hair Tonic	Gatsby Waterglosds Soft	Care Natural Honey Lotion	Huda Beauty 21
3	Neem Face Wash	Kala Kola	Bioamla Hair Oil	Silkee Honey Lotion	Beauty Lipstick
4	Fairness Face Wash	Garnier Color	Herbal Hair Oil	Caresse Lotion	Matte Lipstick
5	Clean & Clear	Samsol Hair Color	Dabur Amla Hair Oil	Olivia Sweet Vanilla Rush	Matte Lipstick
6	Skin White Whitening Face Wash	Keune Tinta Color	Vaseline Hair Tonic	Olivia Moisturizing Milk	Diefei Matte Lipstick
7	Navia Neem Face Wash	Orona Silk Hair Color	Vatika Almond Oil	Fair and Lovely Moisturising Lotion	Moisture Extreme Lipstick
8	Due Face Wash	Sunstar Hair Color	Sultan Rapeseed Oil	Ponds Moisturising Lotion	Peach Delight Semi Mattlipstick
9	Garnier Men	Prama Hair Color	Johnsons Bby Oil	Golden Peal Multi Action	Professional Makeup Lipstick
10	Face Fresh	Adore Cream Hair Dye	Forhans Hair Tonic	Vaseline Men Repairing Moisture	Diamond Shine Waterproof Lipstick

Chapter 3 Results and Discussion

3.1 Overall labelling percentage

Total 150 items were analyzed in this study, among which only 64 were labeled and rest 86 were not. This shows the negligence of producers for plastic labelling, lack of awareness and may also be lack of implementation of rules and regulations. When polythene bags were banned by EPA in Islamabad the conditional use of polythene bags was allowed for few sectors. i.e. for hospital waste, but Pakistan EPA made the labelling of recycled content conditional for selling or using of polythene flat bags. Same regulations can made for all producers of plastic. (Figure 3.1; comparison of observed labelled and non labelled items).
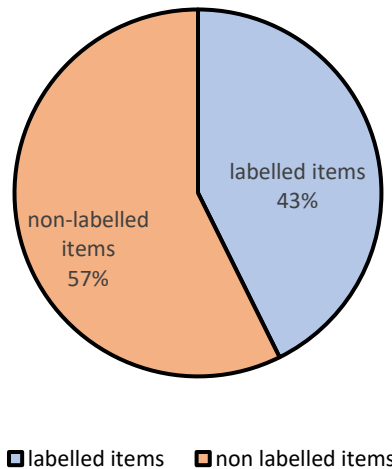
Figure 3.1 Comparison of observed labelled and non labelled items.

3.2 Comparison of labelling among subcategories

The 150 items were observed under three subcategories (50 items in each subcategory). i.e. 1) Edibles 2) detergents 3) cosmetics. Among the 50 edible items only 13 were labelled and 37 were not. In the subcategory of detergents 27 were labelled and 23 were not. And cosmetic items shown the 24 items labelled and 26 un labelled. The highest risk of plastic pollution has associated with the edibles as we directly ingest the packed food in plastic wraps and least labelling were

observed on the edibles. Detergents have the highest labelling ratio i.e. 42% as compared with edible s and cosmetics. (Figure 3.2; relative percentage of labelled items in each subcategory).

edibles   detergents   cosmetics
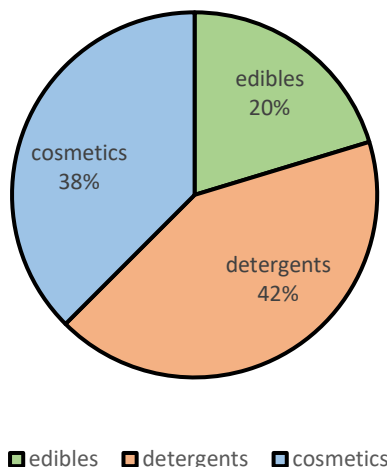
Figure 3.2 Relative percentage of labelled items in each subcategory

3.3 Relative Percentage of Labelled Edibles

Focusing on the five different edible items that includes biscuits, snacks, preserved milks, juices, and cooking oils. Each item has the ten different products in it. Biscuits shows the eight percent labelled items. Snacks and preserved milks are zero percent labelled. Juices are fifty-four percent labelled and cooking oils are thirty-eight percent labelled. These results had revealed that labelling concerns was linked with the type of materials used for packaging. Cooking oils and juices were mostly packed in the HDPE and PET bottles and they had the maximum labelling in edibles. While snacks and biscuits are packed into the wraps that mostly lies in the OTHER polymer type, they had minimum labelling. And preserved milks are packed into the tetra packs which is the combination of cellulose, aluminum, and polyethylene. But nothing was mentioned about it on any one of preserved milk. (Figure 3.3; relative percentage of labelled items from edible subcategory).

biscuits
8%

snacks
0%

preserved milk
0%

cooking oils
38%

juices
54%

■ biscuits ■ snacks ■ preserved milk ■ juices ■ cooking oils
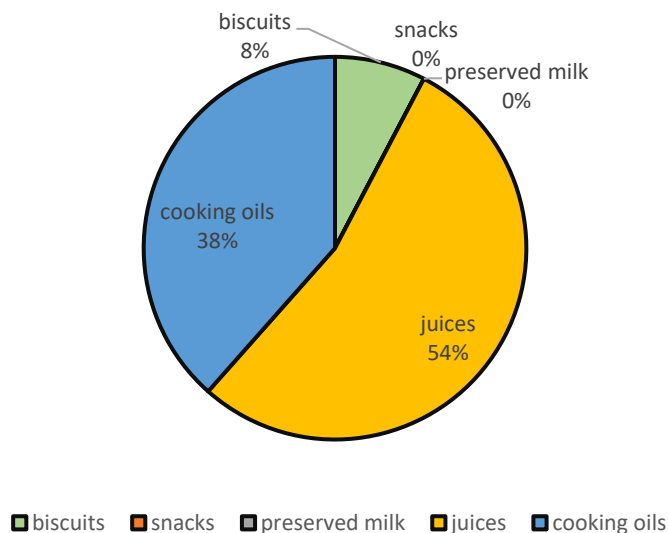
Figure 3.3 Relative percentage of labelled items from edible subcategory

3.4 Relative Percentage of Labelled Detergents

Second subcategory includes the detergents in which body soaps, shampoos, laundry items, and other detergents are placed. Body soaps has 15% labelling while shampoos are 37% labeled. Laundry items are 6% and other detergents are 20% labeled. Toothpastes does not have any labelling relevant to plastic type. Highest percentage of labelling was observed in shampoo HDPE bottles i.e. all the observed shampoo was labelled and none of the toothpaste brand had mentioned plastic type. Laundry items and other detergents are in between them. Hence it is evident that labelling percentage is based on the product from different brands. As the all the observed shampoos were selected from different brands but all were labelled. Overall 46% percent of detergents are not labelled while 54% are labelled (Figure 3.4; relative percentage labelled items from detergent subcategory).
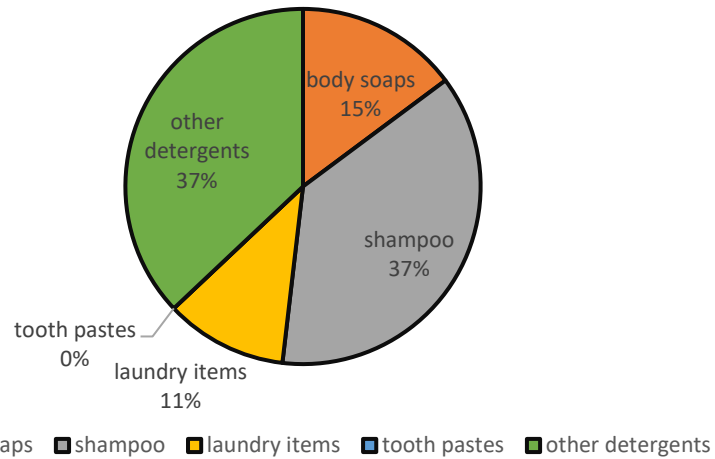
Figure 3.4 Relative percentage of labelled items from detergent subcategory

3.5 Relative Percentage of Labelled Cosmetics Products

Cosmetics items are fifty percent labelled. i.e. face wash having fourteen percent labelling and hair colors are only two percent labelled. Nineteen percent of oils and jells are labelled and fifteen percent of body lotions are labelled. 10 different brands of lipsticks were observed and unfortunately no one is labelled with plastic type. (Figure 3.5; relative percentage of labelled items from cosmetics).
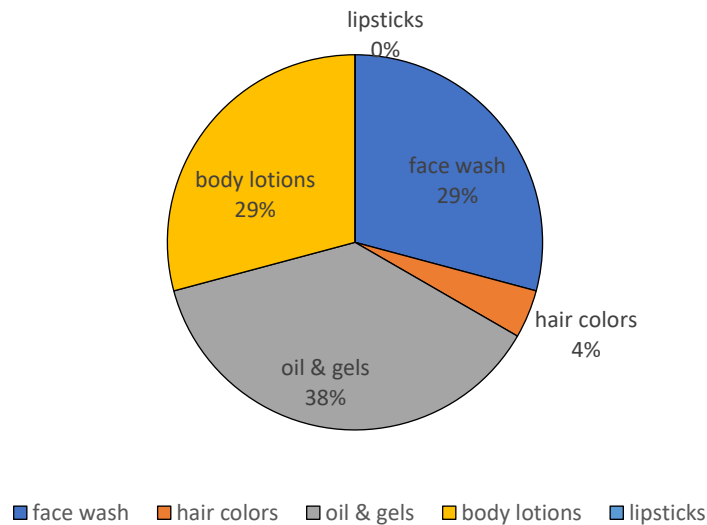

Figure 3.5 Relative percentage of labelled items from cosmetics subcategory.

DISCUSSION

After observing the total of 150 items different points were evaluated. Among all observed products the edibles have the least labelling. But the edibles have the direct contact of plastic with food, which we eat. Harmful plastic particles can move to the human body eventually transferring to the blood stream, which can cause severe health damage.

Most of the single use plastic packaging has the not satisfactory labeling. For example, the snacks, biscuits, or preserved milks. The packaging of these items is only for one time use and after using, these were discarded to waste. These should be proper labeling on each single use plastic packaging because this type of plastic is transferred to waste after a single use.

The HDPE and PET is mostly used in the plastic bottles of shampoo or juices bottles and these bottles are majorly reusable and causing less environmental pollution as compared with other single use plastics. These types of bottles have the highest ratio of labelling among the observed items.

There are some brands which have their attention on plastic labeling and while some have no attention for plastic labelling. The Unilever brand has the highest ratio of labelled products belonging to different categories

Conclusions

- There is lack of scientific literature about seven types of plastic labelling.
- There is lack of awareness in shopkeepers regarding the importance of plastic labelling.
- After receiving the briefing, shopkeepers have optimistic approach for plastic labelling. They had considered it safer step for preventing environmental pollution.
- There is lack of labelling in each category.
- Labelling is related to the type of analyzed product hence Shampoo have the maximum labelling and snacks and preserved milks have least.
- Edibles have the least labelling compared to cosmetics and detergents.
- Environmental agencies have the least focus towards plastic labelling.

Recommendations

- Based on results the edible portion require more monitoring then other categories.
- Data can help departments concerning the environmental matters.
- Public awareness is crucial for making the labelling of plastic necessary.
- Government should implement laws for restriction of selling items without labelling.

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Section 4 APPENDICES

Table4.1 Generalized quantitative analysis of labelled and non labelled items

Total Labelled and Non-Labelled Items	
Total Observed Items	150
Labelled Items	64
Non-Labelled Items	86

Table4.2 Quantitative measure of labelled items in edibles, detergents, and cosmetics

Total Labelled Items from Major Categories		
Sr.no	Categories	Observed Labelling
1	Edibles	13/50
2	Detergents	27/50
3	Cosmetics	24/50
4	Non-Labelled	86/150

Table4.3 Quantity of labelled items in edibles, detergents, and cosmetics

Subcategories Labelling

Sr No.	Edibles	Labelled Items	Detergents	Labelled Items	Cosmetics	Labelled Items
1	Biscuits	1	Body Soaps	4	Face Wash	7
2	Snacks Preserved	0	Shampoo	10	Hair Colors	1
3	Milk	0	Laundry Items	3	Oil & Gels Body	9
4	Juices Cooking	7	Toothpastes Other	0	Lotions	7
5	Oils	5	Detergents	10	Lipsticks	0
6	Nil	37	Nil	23	Nil	24

Table 4.4 Observed labelling of polymer type used in packaging of edibles

Biscuits

Sr No.	Items	Company	Observed Labelling
1	Sooper	Peek Freans	NIL
2	Prince	Lu (Continental Biscuits Ltd)	NIL
3	Rio	Peek Freans	NIL
4	Party	Peek Freans	NIL
5	Marie	Peek Freans	NIL
6	Candi	Lu (Continental Biscuits Ltd)	NIL
7	Chocolate Chip	Peek Freans	NIL
8	Gala	Lu (Continental Biscuits Ltd)	NIL
9	Digestive	Innovative	OTHERS,7
10	Butter puff	Peek Freans	NIL

Snacks

Sr No.	Items	Company	Observed Labelling
1	Lays	Pepsi Cola International	NIL
2	Kurkure	Pepsi Cola International	NIL
3	Salanty	Kolson	NIL
4	Wavy	Pepsi Cola International	NIL
5	Peanuts Salted	Tripple Em Pvt.Ltd	NIL
6	Catty Chins	Tripple Em Pvt.Ltd	NIL
7	Kurlees	Ismail Industries Ltd	NIL
8	Cheetos	Pepsi Cola International	NIL
9	Potato Sticks	Kolson	NIL
10	Super Crisp BBQ Crinkled	Tripple Em Pvt.Ltd	NIL

Preserved Milk

Sr No.	Items	Company	Observed Labelling
1	Milk Pak	Nestle	NIL
2	Olpers	Engro Pakistan	NIL
3	Dairy Pure	Shakargang	NIL
4	Qudrat	Shakargang	NIL
5	Cup Shup	Dalda Foods	NIL
6	Tarang	Tarang Food and Beverages	NIL
7	Every Day	Nestle	NIL
8	Haleeb	Haleeb Foods	NIL
9	Nurpur	Fauji Foods Limited	NIL
10	Nesvita	Nestle	NIL

Juices and Soft Drinks

Sr No.	Items	Company	Observed Labelling
1	Gourmet Cola	Gourmet Foods	PET,1
2	Mountain Dew	PepsiCo	PET,1
3	Seven up	PepsiCo	PET,1
4	Pepsi	Pepsi cola	PET,1
5	Big Apple	Murree Brewery	PET,1
6	Fruitien	Citropak Limited	NIL
7	Jam-E-Shirin	Qarshi	PET,1
8	Roohafza	Hamdard	PET,1
9	Fruiticana Guava Fruit Drink	Fruiticana Foods	NIL
10	Slice Mango	PepsiCo	NIL

Cooking Oils

Sr No.	Items	Company	Observed Labelling
1	Sufi Canola Cooking Oil 3 Litres	Hamza Vegetable Oil Refinery & Ghee Mills	PET,1
2	Dalda Fortified Cooking Oil	Dalda Foods	PET,1
3	Season Canola 4.5litres	Season Edible Oil Limited	NIL
4	Kashmir Blended Vegetable Oil 10 Litres	United Industries Limited	NIL
5	Kisan Super Cooking Oil	Kisan Food	PET,1
6	Super Habib Pure Soybean Oil 3litres	Habib Oil Mills	NIL
7	Eva Cooking Oil	Shujabad Agro Industries	NIL
8	Mezan Canola Oil 3litres	Mezan Group	PET,1
9	Bogres Extra Virgin Olive Oil 5liter	Bogres Organic Olive Oil Company	PET,1
10	Handi Cooking Oil 1 Litre	Habib Oil Mills	NIL

Table4.5 Observed labelling of polymer type used in packaging of detergents

Body Soaps

SR NO.	Items	Company	Observed Labelling
1	Safeguard Floral Scent	Procter & Gamble	NIL
2	Palmolive Hydrating Glow	Colgate-Palmolive Pakistan	NIL
3	Fair & Lovely Glowing Kin Soap	Unilever	OTHER,7
4	Dettol Original	Dettol	NIL
5	Lifebuoy	Unilever	OTHER,7
6	Classic Beauty Soap	Sufi Soap and Chemical Industries	NIL
7	Lux Purple Lotus	Unilever	PP,5
8	Lux Green	Unilever	OTHER,7
9	Capri Moisturizing	Zil Limited	NIL
10	Savannah Classic	Savannah Soap & Bath Company	NIL

Shampoo

SR NO.	Items	Company	Observed Labelling
1	Head & Shoulder	Procter & Gamble	HDPE,2
2	Sunsilk	Unilever	LDPE,4
3	Clear	Unilever	LDPE,4
4	Pantene	Procter & Gamble	HDPE,2
5	L'oreal	L'oreal Pakistan	HDPE,2
6	Dove	Unilever	LDPE,4
7	Vatika	Pakistan Cosmetic Product	HDPE,2
8	Bioamla	Forvil Cosmetics Pakistan	HDPE,2
9	Samsol	Samsol International Pvt Ltd	PET,1
10	Lifebuoy	Unilever	HDPE,2

Laundry Items

SR NO.	Items	Company	Observed Labelling
1	Ariel Surf	Procter & Gamble	NIL
2	Surf Excel	Unilever	OTHERS,7
3	New Bonus Active	Colgate-Palmolive	NIL
4	Express Power	Colgate-Palmolive	NIL
5	Bego Washing Powder	Sgoc Products Lahore	NIL
6	Brite Maximum Power	Colgate-Palmolive	NIL
7	Sufi Soap Vermicelli	Sufi Soap and Chemical Industries Pvt Ltd	NIL
8	Surf Excel Matic	Unilever	OTHERS,7
9	Robin Bleach	Atlantis Chemical Industries	HDPE,2
10	Gaye Soap	Azhar Corporation Pvt Ltd Faisalabad	RECYCLEABLE

Toothpastes

SR NO.	Items	Company	Observed Labelling
1	Closeup Deep Action	Unilever	PAP,20
2	Doctor with Fluoride	Anfords England Ltd	NIL
3	Colgate Sensitive	Colgate-Palmolive	NIL
4	Medicam Dental Cream	Marriana International Karachi	NIL
5	Parodontax Extra Fresh	GlaxoSmithKline	NIL
6	Sensodyne	GlaxoSmithKline	NIL
7	Sparkle Fluoride Toothpaste	Colgate-Palmolive	NIL
8	Aqua fresh Al In One Protection	GlaxoSmithKline	NIL
9	Forhan's Triclosan Free	Forhans Private Limited	NIL
10	English Fluoride Toothpaste Regular Mint	Sarwana & Sohzsihm Pakistan	NIL

Other Detergents

SR NO.	Items	Company	Observed Labelling
1	Power Plus Glass and Household Cleaner	Power Plus Co	PET,1
2	Harpic Disinfectant Toilet Cleaner	Harpic Toilet-Bowl Cleaner	HDPE,2
3	Vim Active Dish Wash Gel	Unilever	PET,1
4	New Dettol Multi Surface Cleaner	Dettol	PP,3
5	Lemon Max Dishwash Liquid	Colgate-Palmolive	HDPE,2
6	Lemon Max Dishwashing Paste	Colgate-Palmolive	PS,6
7	Domex Toilet Expert	Unilever	HDPE,2
8	Safeguard Pure White Antibacterial Hand Wash	Procter & Gamble	HDPE,2
9	Tyfon Total Control Insect Killer	Tyfon	HDPE,2
10	Lifebuoy Hand Sanitizer Gel	Unilever	LDPE,4

Table4.6; observed labelling of polymer type used in packaging of cosmetics

Face Wash

Sr No.	Items	Company	Observed Labelling
1	Ponds Pimple Clear	Unilever	OTHERS,7
2	Fair and Lovely	Unilever	OTHERS,7
3	Active Neem Face Wash	Golden Peal Cosmetics Pvt.Ltd Pakistan	NIL
4	Fairness Face Wash	Stillman	NIL
5	Clean & Clear	Johnson & Johnson Philippines	PET,1
6	Skin White Whitening Face Wash	Skin Care Company Pakistan	PP,5
7	Navia Neem Face Wash	Lowa International Pakistan	PP,5
8	Due Face Wash	Kreative Cosmetics Pakistan	PP,5
9	Garnier Men	Garnier	OTHERS,7 + PP,5
10	Face Fresh	Shaheen Cosmetic Pakistan	NIL

Hair Colors

SR NO.	Items	Company	Observed Labelling
1	Olivia Hair Color	Maskatiya Industries Pvt, Ltd Pak	NILL
2	Black Rose Super Hair Tonic	Kaw Cosmetics Pakistani Company	RECYCLING
3	Kala Kola	United Trading Pvt, Ltd Pak	HDPE,2
4	Garnier Color Naturak Crème	L'oreal Pakistan	PAP
5	Samsol Hair Color	Samsol International	NIL
6	Keune Tinta Color	Keune Amsterdam	NIL
7	Orona Silk Hair Color	Familly Care Cosmetics	NIL
8	Sunstar Cream Hair Color	Emech Cosmetics International Pakistan	NIL
9	Prama Cream Hair Color	Forvil Cosmetics Pak	NIL
10	Adore Cream Hair Dye	Aghas International Pvt, Ltd	NIL

Oil and Gels

SR NO.	Items	Company	Observed Labelling
1	Aloe Vera Soothing Gel	France Wokali Cosmetics International	OTHERS,7
2	Gatsby Water gloss Soft	Mandom Indonesia	PET,1
3	Bio amla Hair Oil	Forvil Cosmetics Pakistan	PET,1
4	Seven Herbal Hair Oil	C.P.H.L Swat Pakistan	PET,1
5	Dabur Amla Hair Oil	Dabur International	PET,1
6	Vaseline Hair Tonic	Unilever	PET,1
7	Vatika Almond Oil	Pakistan Cosmetics Product	PET,1
8	Sultan Rapeseed Oil	Hilal Industries Limited	PET,1
9	Johnsons Baby Oil	Johnson & Johnson	PET,1
10	Forhans Hair Tonic	Forhan's Private Limited	NIL

Body Lotions

SR NO.	Items	Company	Observed Labelling
1	Johnson's Baby Lotion	Johnsons & Johnsons	HDPE,2
2	Care Natural Honey Lotion	Beauty Experts Private Limited	PET,1
3	Silkee Honey Lotion	Silkee	HDPE,2
4	Caresse Honey Lotion	Pentonova Ltd-UK	PLASTECH 3
5	Olivia Sweet Vanilla Rush	Maskatiya Industries Pvt Ltd	NIL
6	Olivia Moisturizing Milk	Maskatiya Industries Pvt Ltd	NIL
7	Fair and Lovely Moisturizing Lotion	Unilever	2,4,5
8	Ponds Moisturizing Lotion	Unilever	2,5
9	Golden Peal Multi Action	Golden Pearl Cosmetics Pvt Ltd	HDPE,2
10	Vaseline Men Repairing Moisture	Unilever	PE,4

Lipsticks

SR NO.	Items	Company	Observed Labelling
1	Miss Green 10	Miss Green	NIL
2	Huda Beauty 21	Huda Beauty	NIL
3	Beauty Lipstick	Comfort Beauty	NIL
4	Matte Lipstick	Huda Beauty	NIL
5	Matte Lipstick	Comfort Beauty	NIL
6	Diefei Matte Lipstick	Diefei	NIL
7	Moisture Extreme Lipstick	Miss Green	NIL
8	Peach Delight Semi Mat lipstick	Calista	NIL
9	Professional Makeup Lipstick	Miss Rose	NIL
10	Diamond Shine Waterproof Lipstick	Verri France	NIL