UNDERSTANDING BUYING BEHAVIOUR AND AWARENESS OF STUDENTS REGARDING PLASTIC USAGE

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Plastic—'a miracle material', has become an indispensable part of our life, and living without it may pose significant challenges and difficulties. In spite of many advantages attached to it, plastic is a serious environmental threat and its disposal has become a cause of concern worldwide. It has reached even the remotest areas on earth in the form of microplastics—in the Arctic, on glaciers, in oceans and rivers, severely affecting terrestrial and aquatic ecosystems. In order to preserve the fine balance of ecosystems, it is extremely important to create awareness and educate students regarding the importance of environmental conservation and eliminating plastic usage from our daily lives. The present research was carried out to understand the buying behaviour and awareness of students regarding plastic usage at household level. Information was sought about common sources of plastic waste generation due to lifestyle choices. The study also tried to suggest strategies to reduce plastic usage and adopting plastic waste segregation at source. The study also focuses on the need to create awareness through integrated programme-based approaches at schools, homes and communities to eliminate single-use plastic from the environment.

Keywords: Awareness, Buying Behaviour, Environment, Single-use Plastic, Waste Segregation

Introduction

The word plastic is derived from the Greek verb '*plassein*', which originally means to mould or to shape something (Meikle, 1997). Plastics are flexible materials due to long, bouncy chains of carbon, oxygen and hydrogen atoms which are arranged in repeating patterns that behave like a snake's skin. The first synthetic plastics, such as celluloid and phenol formaldehyde, were developed in the late 19th and early 20th century (Ziarsolo, 2023). Today, usage of plastic products has become an integral part of our daily lives. They are increasingly being used due to their multi-functional usages, long life, easy availability and lower cost (Abd Hamid and Wan Yahaya, 2020; Pandirajan et al. 2020; Alteneiji et al., 2024*).

The production and usage of plastic increased tremendously since the first industrial production of plastic in the 1940s (Subramanian, 2016). The global production of plastics (excluding fibres of polyethylene terephthalate (PET), polypropylene (PP) and Polyamide) was estimated to be 335 million tons in 2016. Around 50 per cent of the plastics produced is used for single-use consumption items like product packaging, disposable cutlery, cups, plastic bags and other consumer goods. The rest is used for long-term infrastructural and structural

*This citation was added later to enhance the paper before its publication in 2025.

needs like pipes, and for durable consumer applications such as in furniture and vehicles (Subramanian, 2016). Since the first plastic polymers were introduced, about 6 billion tons of plastics have been produced and distributed across the world, nearly one ton for every person currently living.

Plastic pollution has become a global crisis which needs our immediate attention. Presence of microplastics in about 94 per cent of tap water samples collected in the United States was reported in a study conducted by the US Environmental Protection Agency (US EPA), published in 2021 (USEPA, 2021). The situation is so grim that the Centres for Disease Control and Prevention has reported that cancer prevalence rate in men and women will increase by 24 per cent and 21 per cent respectively between 2010 and 2020 due to bioaccumulation of plastics in our bodies through our food chain and contamination of potable water. Plastic pollution is now recorded to have reached the most remote and pristine places on earth like glaciers in the arctic, oceans and rivers, severely affecting terrestrial and aquatic ecosystems (Alteneiji et al., 2024*). It has been projected that by 2050 we will see more plastics by weight than fish in the oceans (Williams and Rangel-Buitrago, 2022). Chunks of plastics discovered floating in the oceans of the Arctic have incited fear in the minds of researchers about the far reach of this man-made waste (Pandirajan et al., 2020).

The issue related to plastic pollution is of immense concern and has been discussed even at the international forums. It has been recognised in the United Nations Sustainable Development Goal 14 (SDG 14) indicator 14.1.1 related to the index of coastal eutrophication and floating plastics debris density (Walker, 2021). Chemical and hazardous substances released by the plastic product pose a significant threat to human health and environment (Hamza and Mahmoud, 2023). Majority of these plastic products are non-biodegradable and their disposal has become a global environmental concern.

Plastic usage is a growing concern globally due to its adverse effects on the environment. According to a report by the Central Pollution Control Board (CPCB) of India, the total plastic waste generated in India exceeds 3 million metric tonnes every year. Realising the gravity of the situation, the Government of India imposed a pan-India ban on about 19 single-use plastic items, which were identified as having low utility but high littering potential, through amendments in the Plastic Waste Management (PWM) Rules, 2021. Government prohibited import, manufacture, stocking, distribution, sale and use of single-use plastic products. The amendments came into force in July 2022 (Nøklebye et al., 2023).

To fully understand the grimness of the situation, we need to understand the catastrophic effects of plastics on human health and environment, and find out ways to limit its usage in our lives. Delhi-NCR, being one of the most densely populated regions in India, ranks as the 2nd highest per capita consumer of plastic and faces significant challenges with plastic waste management (Gupta and Kumar, 2021). Thus, the current research paper aims to understand buying behaviour and awareness of students regarding plastic usage at the household level in Delhi-NCR region. The study also investigates their knowledge about the effects of plastic on environmental degradation and suggests potential strategies for minimising plastic usage and waste generation.

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Materials and Methods

Study Area

The present study was conducted in Delhi-NCR region in the month of January–February 2023. The method applied to this research involved quantitative and qualitative analysis in which data was collected through online surveys using pre-designed structured questionnaire with the help of google forms disseminated through social media platforms such as e-mails, Facebook and WhatsApp to the students in immediate contact. The total number of responses included in this study were 236. Studying the buying behaviour and awareness of students regarding plastic usage at the household level and their knowledge towards environmental concerns is vital as they can play an important role in solving environmental problems through lifestyle changes. The respondents were chosen randomly after they gave their consent to take part in the research study. Data confidentiality was maintained to keep anonymity of the schools and the respondents selected for the study.

Sample Size Calculation

Determining the optimal sample size for a research study is a critical step in any planned research protocol which assures to detect accurate and adequate statistical significance.

Calculation,

$n = Z^2P(1-P)/ME^2$

where,

n = minimum sample size required

Z = confidence level

P = expected prevalence

ME = Margin of Error

For any ideal research, the ideal Margin of Error (ME) should lie between 5 per cent and 10 per cent. Hence, considering expected prevalence (P) to be 0.5 or 50 per cent or Margin of Error (ME) to be 7 per cent and a confidence level of 95 per cent, the minimum sample size (n) was calculated to be 204 (Dowarah, Duarah and Devipriya, 2022). The number of respondents in the current study were 236 students of VIII–XII class studying in Delhi-NCR schools.

Research Instrument/Questionnaire Used

The research instrument or questionnaire was designed to elicit information on plastic usage practices, buying behaviour and awareness of students. The preliminary draft of the questionnaire was pre-tested on 30 students who were not part of the actual study. Based on the pre-testing results, few minor language corrections were incorporated in some of the questions. The online questionnaire was designed in simple and unbiased English language. The questionnaire had twenty-seven questions divided into four (04) parts:

- Demographic Profile
- Plastic Usage Pattern and Buying Behaviour
- Waste Segregation and Disposal
- Awareness about Effects of Plastic Usage on Environment

Analysis of Data

The data was compiled using a spreadsheet in MS Excel and the analysis of the compiled data set was done using a statistical package for social sciences i.e. SPSS software.

Results and Discussion

In this part of the study, the buying behavioural practices, waste segregation practices at source and awareness of students about the effects of plastic on the environment are presented.

Demographic Profile

The analysis of the data revealed that the majority (73.3 per cent) of the respondents were below 15 years of age. A slightly higher percentage of females than males participated in the study (53.4 per cent versus 46.6 per cent). The data on family size revealed that the majority of the respondents had 4–6 members in their family. About 31 per cent respondents had family income between Rs. 20,000–50,000, followed by 25 per cent having family income between Rs. 50,000 to Rs. 1,00,000.

Table 1: Distribution of Respondents According to Demographic Characteristics

Criteria	Respondents	Percentage (%)
Age-wise Distribution		
< 15 years	173	73.3
> 15 years	63	26.7
Gender Distribution		
Male	110	46.6
Female	126	53.4
Family Size		
1–3 Members	37	15.7
4–6 Members	166	70.3
7–9 Members	15	6.4
>9 Members	18	7.6
Monthly Family Income		
< Rs. 20,000	40	16.9
Rs. 20,000–50,000	73	30.9
Rs. 50,000–1,00,000	59	25
Rs. 1,00,000–2,00,000	30	12.7
>Rs. 2,00,000	34	14.4

Plastic Usage Pattern and Buying Behaviour

When asked about the plastic items used by the respondents in everyday life, the most commonly reported items included single-use plastic bags, packaged water bottles, packaged food items like chips, biscuits, pulses, cereals and spices, disposable cutlery, pen, lunch box, skincare products like shampoo, toothpaste, earbuds with plastic sticks, etc. Out of these, the research focuses on usage of plastic bags, bottled water, straws and consumer products packaged in plastic wrappers.

Usage of single-use plastic bags: In the first question, we tried to know how many plastic bags were used by the respondents at household level on a daily basis.

The data analysis revealed that about 37.3 per cent (88) of the respondents used less than 2 plastic bags, 36 per cent (85) used 2–4 plastic bags and 5.1 per cent (12) used more than five plastic bags on a daily basis. It was also interesting to know that about 21.6 per cent (51) of respondents stated that they do not use plastic bags at all (Fig.1). These results are similar to findings highlighted in the research study by Shaira et al. (2020), wherein, it was reported that more than one-third of the respondents used around 3–5 plastic items on weekly basis and few participants rarely used plastic items i.e. once or twice a month.

Further, a large number of respondents (64.4 per cent) reported that they always carry reusable bags when they go shopping, 33.1 per cent carry it sometimes and only 2.5 per cent said they never carry bags when they go shopping.

Consumer items packaged in plastic wrappers: Regarding preference for buying consumer products packed in plastic packaging, the majority of the respondents i.e. 57.2 per cent (135) stated that they rarely bought packaged items, followed by 28.4 per cent (67) who often bought packaged items. About 14.4 per cent (34) of the respondents mentioned that they never bought packaged items from the market. The results highlighted the need for promotion of sustainable packaging materials by companies through government policies and interventions facilitating sustainable buying behaviour.

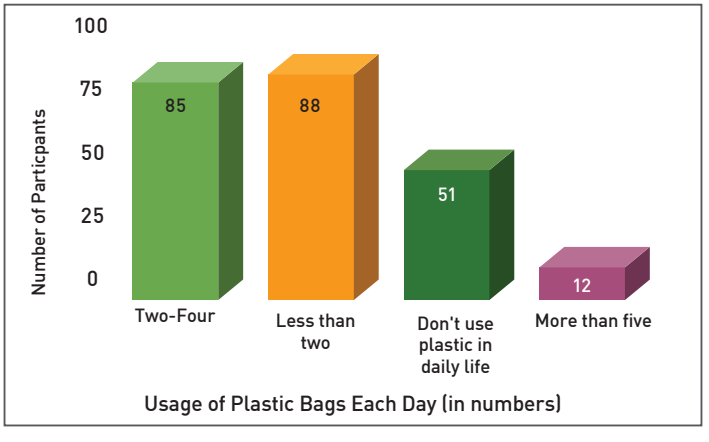

Fig. 1. Usage of plastic bags each day (in numbers)

Packaged water bottles and plastic straws: About 56.8 per cent (134) reported that they rarely buy plastic bottled water and buy it only in case of emergency. About 38.6 per cent (91) of respondents stated they never buy packaged water and carry their own reusable water bottles when they go out. A very small percentage of respondents (4.7 per cent) frequently bought packaged water [Fig. 2 (a)]. In spite of having knowledge and awareness about hazards of single-use plastics, a large number of respondents (37.7 per cent) used disposable single-use plastic straws for drinking in restaurants, as these are easily available and economically viable compared to paper straws.

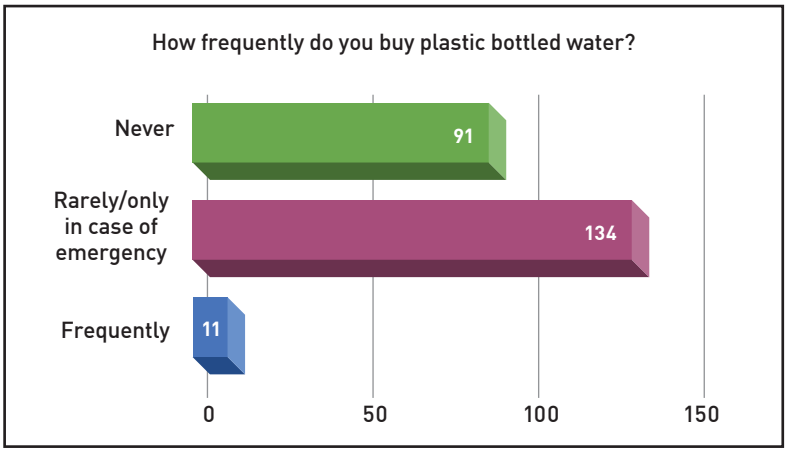

Fig. 2(a). Frequency of buying packaged water bottles

Fig. 2(b). Usage of disposable plastic straws at restaurants

Difficulty in using reusable bag alternatives:
In response to the question regarding what makes it difficult for them to use reusable cloth bags or an alternative, Fig. 3 shows that respondents top response was that they often forgot to take reusable bags along with them (63 respondents), or they find these cloth bags and alternatives expensive replacement (30 respondents). These findings suggest that consumers may be interested in using sustainable alternatives for plastic bags but need awareness and motivation. Therefore, appropriate interventions are required to encourage consumers and remind them to use environment-friendly green alternatives (Putnam-Farr et al., 2023; Hossain, 2024**). It is also advisable that consumers keep spare reusable cloth or jute bags in their personal vehicles, so that in case they forget to carry them along for shopping, they can use these spare bags.

Respondents' behaviour for not carrying reusable cloth bags was also found to be influenced by the easy accessibility of cheap and freely available plastic bags in shops (12.7 per cent). These findings are similar to that stated by Hossain in their research study in 2024, in which consumers preferred to use plastic bags simply because they are easily available and convenient to use. It was also reported that younger people often use plastic bags than elderly people as they seem to prefer convenience and have a faster pace of living. Grocery stores and supermarkets need to offer innovative alternatives to plastic bags like reusable cloth bags or paper bags at cheaper rates or returnable cloth bag options to consumers at small refundable cost. Research studies have also shown that charging a small fee for plastic bags may prove to be effective in reducing usage of plastic bags by consumers (Jakovcevic et al., 2014).

About 10.2 per cent respondents also stated that the store from which they make purchases doesn't pack their food in reusable bags and containers and hence they have to rely on disposable plastic containers or plastic bags. Strict government enforcement to restrict or limit availability of plastic bags to consumers can prove to be an effective strategy to decrease the use of plastic bags in daily lives.

Fig. 3. Reasons for difficulty faced in carrying reusable cloth bags for shopping

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Waste Segregation Practices Followed by Students at Household Level

Regarding students' behaviour towards waste segregation, about 36.4 per cent respondents reported that they segregate plastic waste at source, followed by 54.2 per cent who did it sometimes and 9.3 per cent who did not segregate waste at all (Fig. 4). This shows that students did not prioritise waste segregation due to lack of personal commitment, responsibility and understanding of environmental issues. Regular educational campaigns and workshops are needed to raise awareness about proper waste segregation at source and motivate students to minimise use of plastics in their daily lives (Dai et al., 2017; Sasananan, 2020). It is also important to spread knowledge acquired at school or college regarding waste segregation to the family members and neighbours through peer learning. Collective efforts of students, educational institutes, communities and government towards better waste segregation and waste management can help bring positive changes in the environment.

To know the final fate of the plastics used by them in everyday life, respondents were asked how they dispose of used plastic bags or other plastic items. In response to this, the majority of the respondents (35.2 per cent) reported that they throw their plastic waste generated at home in a dustbin. This indicates that there is a need to create awareness amongst consumers to segregate their plastic waste regularly and store it separately, so that it can be sent to the appropriate recycling facility. Government initiatives like door-to-door collection of segregated plastic waste from households can also help maximise recovery of plastic waste at source and promote its recycling.

About 26.3 per cent respondents reused plastic bags and plastic containers for household purposes like storing food items, reusing as garbage bags or packaging food items. About 20.2 per cent stated that they segregate plastic waste at source and give it for recycling to NGOs and 15.3 per cent sell it to recyclers. A very small percentage of respondents (2.5 per cent) also reported that they burn their plastic waste.

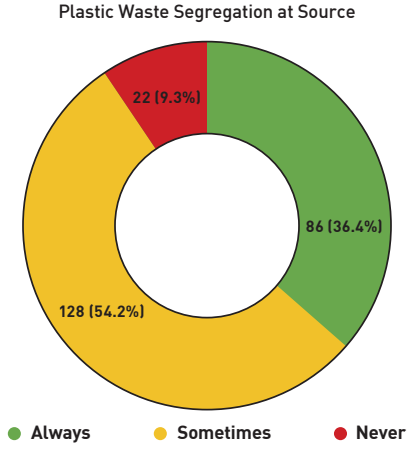

Fig 4. Segregation of plastic waste at source

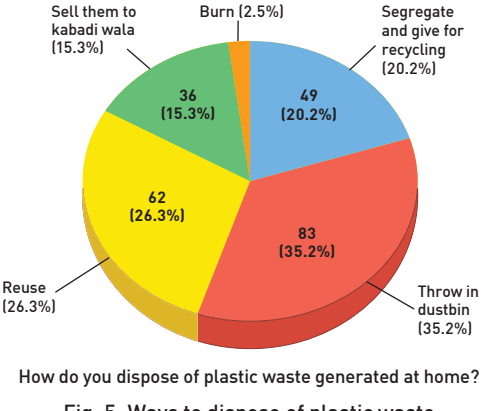

Fig. 5. Ways to dispose of plastic waste at household level

Awareness and Knowledge about Effects of Plastic Usage on Environment

The respondents were well aware about the nature of single-use plastic items and their hazardous impact on the environment. When asked about which of the following belong to single-use plastic, they were aware that juice straws, cutlery items like cups for beverages, spoons and plates are used only once and are thrown after their use. However, the majority of the participants did not know that plastic bags can also belong to the category of single-use plastic items.

The collected data also revealed that the respondents had adequate knowledge and were aware about harmful effects of single-use plastics on the environment. Most of the respondents (78 per cent) were aware that supermarkets and vegetable markets are the major sources for generation of single-use plastic bags. When asked about their perception regarding the effect of plastic on the environment, a large number of respondents (91.9 per cent) agreed that it is harmful for the environment and said that the government should ban single-use plastic products (about 84 per cent said yes). Shaker et al. (2024***) also reported that more than 90 per cent of the participants in their study were aware about the effects of inappropriate management of waste on health and environment.

Despite having widespread knowledge and acceptance about the importance of environmentally conscious behaviour, consumers often fail to adopt more sustainable consumption choices due to lack of motivation and reinforcement. Fig. 6 shows that about 32.6 per cent of the respondents agreed that one should be charged for single-use plastic bags when asked for it during shopping so that people get motivated to carry their own reusable bags. Some respondents (14.4 per cent disagreed and 7.2 per cent strongly disagreed) did not want to pay for single-use plastic bags in spite of knowing that single-use plastic is a potential source of pollution and can cause greater environmental damage. This requires efforts from government stakeholders to ban single-use plastics, so that people have no choice but to adopt and use more sustainable options in place of plastic bags.

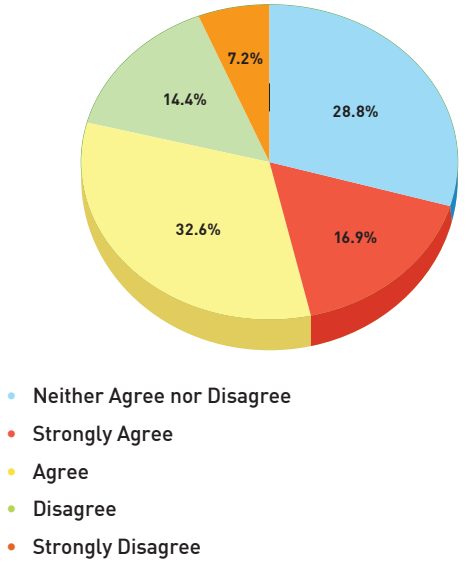

Fig. 6. Paying for single-use plastic bags

When asked about detrimental effects of plastics on the environment, varied responses were given by the respondents which included release of harmful chemicals which pollute the environment, killing of marine life and animals when they consume plastics, causing

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soil pollution, difficulty to decompose and hence increasing load on landfills. Some respondents also reported that microplastics become part of the food chain having long-term detrimental effects on human life and environment. Contrastingly, a large number of participants (67 per cent) did not know that plastics are also one of the major causes of global warming and climate change and were not aware about laws related to ban of single-use plastics in their area.

Regarding solutions to reduce plastic menace from our lives, some of the suggestions given by the respondents included carrying reusable paper or cloth bags for shopping so that people can avoid bringing back plastic bags along with shopped items, using reusable water bottles to avoid buying packaged water, buying products which are packed in an environment-friendly packaging, saying no to single-use plastics and participation in awareness drives. They also suggested that plastic ban enforcement policies along with awareness campaigns need to go hand-in-hand to bring attitudinal change amongst people regarding reduction in plastic usage in everyday life.

Conclusion

Students were well aware about the detrimental effects of usage of plastics on human health and environment, yet most of them used single-use plastic items like polybags, disposable cutlery, packaged water bottles and plastic straws. Different factors were seen responsible for their behaviour which included free and easy availability of these items at their disposal. They are aware of the alternatives which can be used to replace single-use plastics and hence proper training and awareness sessions need to be carried out by schools and educational institutes on a regular basis to inculcate and reinforce sustainable consumption behaviour amongst students.

Accessibility to the single-use plastic bags must be curtailed by the most generating sources like vegetable and grocery markets through support by different stakeholders like consumers, producing companies and government. Further, government policies and interventions are needed to promote sustainable packaging material and influence consumer's buying behaviour. Also, segregation of plastic waste at household level can help maximise the recovery of plastic waste at source and promote its recycling through door-to-door segregated plastic waste collection drives.

Eliminating plastics is a difficult and challenging task which may happen only through an integrated solution-based approach at home, schools and community level (Liu et.al., 2023). Integrating environmental awareness and education in different subjects taught in schools and colleges, involving different societies and groups like eco-clubs, environment committees, and NSS may help in mitigating and minimising plastic pollution. Mass campaigns like 'Say No to Plastics' (Dalu et al., 2020), 'My 10 kg Plastic Waste Campaign' and 'My Trash, My Responsibility' need to be carried out on a regular basis in schools and communities to reinforce the message of reducing plastic usage and saving the environment. Such programmes will help in motivating students to adopt sustainable lifestyles and will inspire them to take charge of their environment and lead the path towards sustainability.

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