

## ORIGINAL ARTICLE

## An Observational Study to Assess the Awareness Regarding Hazards of Reuse of Single-use Plastic Bottle among Medical Students in Indore

Aditya Kumar Khatri, Suraj Sirohi, Amreen Shaikh, Yogesh Chouhan

### ABSTRACT

**Background:** Since the 1950s, the assembly of plastic has outpaced that of just about every other material. Much of the plastic we produce is meant to be thrown away after getting used just one occasion. As a result, plastic packaging accounts for about half the plastic waste within the world. Most of this waste is generated in Asia. Only 9% of 9 billion tonnes of plastic the world has ever produced has been recycled. By 2050, there'll be around 12 billion tonnes of plastic litter in landfills and thus the environment, if current consumption patterns and waste management practices continue. The most common single-use plastics found in the environment are plastic drinking bottles, their caps, food wrappers, plastic bags, plastic lids, and stirrers. Plastic waste causes a lot of problems when it leaks into the environment. **Objective:** The objective of the study was to assess the awareness related to health hazards, consumption behavior pattern, and environment impact awareness and to assess willingness to reduce consumption. **Materials and Methods:** An observational cross-sectional study was done on 450 students of medical college in Indore by simple random sampling (over a period of 5 months), using predesigned semi-structured questionnaire. Medical students who gave consent were included in the study. **Results:** Frequency of use of always using plastic bottle was more in males. Plastic bottles are preferred as it is inexpensive. Disposal habit percentage was more in males as compared to females. Almost all were aware that plastic bottles are non-biodegradable and an environmental hazard. Almost two-thirds agree completely on government's decision to reduce and ban the plastic use. **Conclusion:** According to our study, majority of people use single – use plastic bottles ,as it is easy available. Though most people are aware that these are non-biodegradable and noxious; still most people need to be educated regarding the same.

**Key words:** Hazards, Single-use plastic, Awareness

### INTRODUCTION

Plastic may be a lightweight, hygienic, and resistant material which may be molded during a sort of ways and utilized almost everyday.<sup>[1]</sup> Our ability to deal with plastic waste is already overwhelmed. Only 9% of the 9 billion tonnes of plastic the planet has ever produced has been recycled. Most finishes up in landfills, dumps, or within the environment. By 2050, there'll be around 12 billion tonnes of plastic litter in landfills and therefore the environment if current consumption patterns and waste management practices continue.<sup>[2]</sup> Most plastics do not biodegrade. Instead, they slowly break down into smaller fragments referred to as microplastics.<sup>[3]</sup> Plastic bags and containers made from expanded polystyrene foam (commonly mentioned as “Styrofoam”) can take up to thousands of years to decompose, contaminating soil and water.<sup>[4]</sup> Experts think

that by 2050, the quantity of plastic within the ocean will weigh quite the quantity of fish within the ocean. All animals, whether or not they survive land or within the sea, are often hurt by plastic.<sup>[5]</sup> India's Prime Minister Narendra Modi is pursuing an ambitious project to end single-use plastics by 2022 within the vast South Asian country, which features a population of 1.3 billion.

No study has been conducted in India during this aspect. The target of the study was to assess awareness associated with consumption, behavioral pattern, and environmental

**Correspondence:** Dr. Amreen Shaikh, Department of Community Medicine, MGM Medical College, Indore, Madhya Pradesh, India. E-mail: amreenshaikh95@yahoo.in

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*Department of Community Medicine, MGM Medical College, Indore, Madhya Pradesh, India*

impact health hazards with the utilization of plastic bottles.

## MATERIALS AND METHODS

### Study Design, Setting, and Sample Size

Observational study was done using simple sampling with pre-designed semi-structured questionnaire in 450 students aged group 22–28 years in medical college, Indore, over a duration of 5 months, that is, from August 2019 to January 2020.

### Inclusion Criteria

The study includes all students of 22–28 years who gave consent to fill the pre-designed semi-structured questionnaire.

### Exclusion Criteria

Students aged above 28 years and not willing to offer consent.

### Study Tool

A pre-designed pretested semi-structured questionnaire was used for the assessment. Schedule of activities was formed within the sort of Gantt chart. Fifteen questions were formed within the sort of objective answers consistent with the objectives of the study.

### Ethical Considerations

Ethical approval was obtained from the acceptable authority. Verbal consent was taken from the scholars before filling the questionnaire.

### Data and Statistical Analysis

Data collected were entered into Microsoft Excel software and checked for missing data. After removing the missing data, the descriptive analysis was done using SPSS trial version. Categorical variables are presented as number and percentages. The test of significance was applied for qualitative data which was Chi-square.

## RESULTS

Frequency of always using plastic bottle was more in males (31.6%) than females (6.5%). About 74.2% of females use it sometimes as a compared to males (52.6%). Reason behind preference to plastic bottles over the opposite bottles was inexpensive which was more in males (15.8%) than females (3.2%). About 66.4% of males use find it easily available as compared to females (58.1%). About 87.1% of females use it while traveling while 31.6% of males use it on day to day 68.4% of males use it daily. Disposal habit percentage

was more in males (68.4%) as compared to females (22.6%). About 12.9% of females use it for various purposes. About 47.4% of males and 48.4% of females had the knowledge that plastic is employed for creating bricks. About 51.6% of females and 21.1% of males admitted that they read the label before buying the plastic bottles. About 26.3% of males and 9.7% of females admitted that they never bother to read the label before buying. About 90.3% of females and 73.7% of males accepted that they check the seal before buying. About 63.2% of males and 22.6% of males were conscious of various symbols on the bottle and their significance but they do not care. About 41.1% admitted that they were unaware of it. About 89.5% of males and 87.1% of females had awareness regarding its ill effects on health. About 78.9% of males and 77.4% of females were aware that it's being recycled. About 89.5% of males and 96.8% of females were aware that plastic bottles are non-biodegradable and an environmental hazard. About 74.2% of females and 36.5% of males were conscious of recent initiative taken by Indian government regarding the only use plastics. About 45.2% of males and 47.4% of females accepted TV because the source of data. About 45.2% of females and 36.8% of males admitted internet as a source of data. About 71.0% of females and 68.4% of males agree completely on the government's decision. About 29.0% of females and 10.5% of males afflict the choice as they find it not practical [Table 1].

## DISCUSSION

According to our study, males more frequently use plastic bottles and females use it sometimes. Plastic as easily available and inexpensive is the main reason of its use. Only two-thirds dispose it after use while the left one use it for other purposes. Only half of the participants have a habit to read the labels before buying it. Almost all are aware of the ill effects of the plastics on environment and health. More than half agree on the government's decision to ban the plastic but find it impractical.

According to Quartey *et al.*,<sup>[6]</sup> sustainable management of solid waste is a critical problem for developing countries with respect to climate change and greenhouse gas emissions and also for the general welfare of the population. Sufficient infrastructure to process solid waste in an appropriate manner<sup>[7]</sup> is lacking in developing countries. Preston and Lehne<sup>[8]</sup> showed that in developing countries, the state of the environment and health outcomes has worsened because of a growing waste crisis.

Environmental contamination due to solid waste mismanagement is a global issue. Tan and Khoo compared the potential environmental impacts of waste treatment options such as landfilling, incineration, recycling, and composting.<sup>[9]</sup> According to Kazuva *et al.*,<sup>[10]</sup> a reliable management system is necessary for high-quality and sustainable management of solid waste. Besides the national law, several states and cities have introduced bans

**Table 1:** Frequency of use of plastic bottles

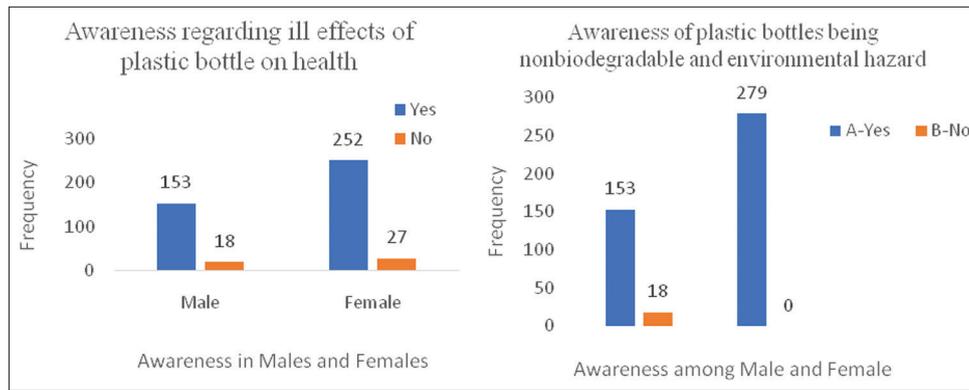
Use of Plastic Bottle	Sex		Chi-square	P-value
	Male (%)	Female (%)		
A-Always	54 (31.6)	18 (6.5)	16.685	0.000
B-Often	273 (15.8)	54 (19.4)		
C-Sometimes	90 (52.6)	207 (74.2)		
Total	171	273		
Reason behind preference over other bottles				
A-Inexpensive	27 (15.8)	3 (3.2)	13.773	0.003
B-Light weight	9 (5.3)	12 (12.9)		
C-Easily available	117 (68.4)	162 (58.1)		
D-Portable	18 (10.5)	72 (25.8)		
Total	171	273		
Time/place of using plastic bottles				
A-While traveling	108 (63.2)	243 (87.1)	18.74	<0.0001
B-At work place	0	9 (3.2)		
C-Daily use	54 (31.6)	18 (6.5)		
D-Do not use	9 (2.3)	9 (3.7)		
Total	171	273		
How often is it used				
A-Daily	63 (10.3)	18 (16.7)	31.321	<0.0001
B-Weekly	0	18 (3.7)		
C-Monthly	45 (16.1)	0		
D-Rarely	9 (63.2)	198 (71)		
Total	171	273		
Alternate use after using once				
A-Reuse it	117 (68.4)	63 (22.6)	31.317	<0.0001
B-Dispose as it is	27.3 (10.5)	44.7 (19.4)		
C-Dispose after crushing	27 (15.8)	126 (45.2)		
D-Use for different purposes	9 (5.3)	36 (12.9)		
Total	171	273		
Knowledge of alternate uses				
A-Manufacturing bricks	0	0	0.816	0.665
B-As polyblend for Roads	81 (47.4)	135 (48.4)		
C-Insulation	18 (10.5)	18 (6.5)		
D-All of these	72 (42.1)	126 (40.9)		
Total	171	273		
Reading the label before buying				
A-Yes, always	36 (21.1)	144 (51.6)	21.607	<0.0001
B-Yes, sometimes	90 (52.6)	108 (38.7)		
C-Never	45 (26.3)	27 (9.7)		
Total	171	279		
Checking seal before buying				
A-Yes	126 (73.7)	252 (90.3)	7.810	0.020
B-Sometimes	9 (5.3)	9 (3.2)		

(Contd...)

**Table 1:** (Continued)

Use of Plastic Bottle	Sex		Chi-square	P-value
	Male (%)	Female (%)		
C-No	36 (21.1)	18 (6.5)		
Total	171	279		
Awareness of various symbols on the bottle and their significance				
A-Yes, follow it	27 (15.8)	99 (35.5)	24.741	<0.0001
B-Yes, but do not care	108 (63.2)	63 (22.6)		
C-Unaware	36 (21.1)	117 (41.9)		
Total	171	279		
Awareness regarding its ill effect on health				
A-Yes	153 (89.5)	252 (87.1)	1.887	0.389
B-No	18 (10.5)	27 (9.7)		
Total	171	279		
Ideas of disposal				
A-Dumped in landfills	18 (10.5)	48	6.994	0.072
B-Incineration	9 (5.3)	0		
C-Recycled	135 (78.9)	216 (77.4)		
D-Sold as scrap	9 (8.2)	9 (5.3)		
Total	171	279		
Awareness of plastic bottles being non-biodegradable and environmental hazards				
A-Yes	315 (89.5)	279 (96.8)	11.829	0.003
B-No	18 (10.5)	0		
Total	171	279		
Awareness of recent initiative taken by Indian government regarding single-use plastics				
A-Yes	81 (36.5)	207 (74.2)	11.037	0.001
B-No	90 (52.6)	81 (25.8)		
Total	171	279		
Source of knowledge about the government's decision				
A-T.V	81 (47.4)	126 (45.2)	1.720	0.633
B-Newspaper	18 (10.5)	18 (7.4)		
C-Internet	63 (36.8)	126 (45.2)		
D-Not aware	9 (3.2)	9 (5.3)		
Total	171	279		
Opinion on banning plastic				
A-Agree completely	117 (68.4)	198 (71.0)	25.113	0.000
B-Agree partially	18 (10.5)	81 (29.0)		
C-Disagree	36 (21.1)	0		
Total	171	279		

on plastic carrier bags and other plastic materials.<sup>[11]</sup> High plastic consumption rates and improper waste handling have increased the amount of environmental pollution in India, with plastic litter becoming an eyesore in many places. Versova is a flat sandy Mumbai beach.<sup>[12]</sup> It used to be an ignored strip of ocean near



slums, used mostly as dumping ground. In October 2015, Afroz Shah, a young Indian lawyer and environmentalist from Mumbai, frustrated with the rotting waste on Versova beach, decided to act. Afroz Shah and his then 84-year-old neighbor started cleaning up the beach themselves.<sup>[12]</sup>

In our study, awareness regarding plastic bottles of being non-biodegradable and an environment hazard came out to be highly significant ( $P = 0.003$ ). Awareness of recent initiative taken by Indian government regarding single use plastics was also significant ( $P = 0.001$ ).

**Limitation**

Time duration of the study was limited. The results are based entirely on answers given in response to the questionnaire, so there is a possibility that some questions may be misinterpreted or intentionally answered incorrectly. The population may not be accurately representative.

**CONCLUSION**

From the results of the present study, it can be concluded that majority of people use single-use plastic bottles. The study reveals that the major reason behind this is easy availability of plastic bottles.

Although most people are aware of the hazards of single-use plastic bottles and that these are non-biodegradable and noxious; still most people need to be educated regarding the same.

The Government of India has taken a big step for the cause of nature by banning the use of single-use plastics and as per our study; this knowledge reaches the mass population mainly through media and internet.

Most of the people are already aware and supporting the government’s action but we need more support and action.

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