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Assessment Of Awareness Level and Perception In Usage Of Plastic Bags And Its Hazards Among Secondary School Students

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Abstract

Objective: The objectives of the study were to determine the frequency of plastic bag usage among secondary school students of Islamabad and to assess their knowledge about plastic bag-associated pollution, its disposal and legislation.
Methods: A cross-sectional descriptive study was conducted from December 2020 to December 2021 in high schools in Islamabad. A sample size of 377 was calculated through Raosoftware comprising 53.6% male and 46.4% female students. Ethical approval was taken with the number ERC/ID/47. A consecutive non-probability sampling technique was used. Inclusion criteria were students of the 8th to 10th class and those who gave consent and filled out the questionnaire. A properly structured questionnaire was used. SPSS version 25 was used for data analysis. Frequencies and percentages were calculated. A chi-square test of significance was applied for categorical variables. A p-value less than 0.05 was considered statistically significant.
Results: About 97.6 % of the participants considered plastic as a contributory factor to environmental pollution and 67.6% used plastic bags as carrying materials. Awareness about alternatives like clothed bags was observed in about 85.9% of students. Regarding legislation, half of the study population opined that the community is responsible for banning plastic bags while the other half suggested that it's the responsibility of the Government. Significant p-value was observed between gender (0.036), age (0.000), education (0.000), knowledge about plastic hazards (0.01), health hazards (0.029) and usage of plastic bags.
Conclusion: The usage of plastic bags was high among the students. Although they were well aware of the hazardous effects of plastic bags, most of them were routinely using plastic bags for daily activities. Different factors that were responsible for the higher usage of plastic bags included a lack of alternatives to plastic bags, easy availability, low cost and lightweight.
Keywords: Awareness, plastic bags, legislation, hazards.

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1. Introduction

Earth is the ultimate home to a large number of organisms, including living and non-living inhabitants. It is now facing challenges due to pollution that is jeopardizing Earth's support system and is detrimental to the survival of organisms.[1] The popularity of plastic bags is due to their low weight, resilience to destruction, sturdiness, and, most importantly, low cost. This technological amenity is endangering the environment and adversely affecting the well-being of individuals.[2]

According to the normal frequency of Municipal Solid Waste (MSW) in Lahore (i.e. 0.65 kg/capita/day), the city's daily MSW output would be 7150 tons/day, with plastic bags being one of the primary physical components of MSW.[3] The plastic bags will, without a doubt, become trash after the tasks have been completed. World Watch Institute estimates that about 10 – 20 million tons of polyethylene bags are discarded after use every year with fewer than 1% being reused. About 90 billion plastic bags are used in America and 30 billion annually in Japan.[4] Pakistan has struggled to keep pace with its massive plastic bag waste, consuming huge amounts of single-use bags annually.

Numbers vary from 55 billion to more than 112 billion, with hardly any waste management in place.[5] The issues and expenditures of discarding plastic products exceed the advantages of using plastic, putting a strain on society as a whole.[6] Polyethylene and polypropylene, which account for about 54% of global plastic production, are commonly used not just for packaging but also for securing, providing, and discarding all sorts of products and, due to their non-biodegradable nature, can last for up to 4500 years in the eco system.[7] Toxic chemicals from breakdown of plastic disrupt hormone levels in animals and passed into humans after entry into the food chain, thus creating endocrine disturbances.[8]

Plastic bags are almost always deposited into millions of dumps around the world, which generate harmful gases like methane and carbon dioxide as well as substantially obstruct sewer systems, degrade agricultural lands, and pollute water bodies.[9] As a result, it is the need of the hour to replace plastic with other products to avoid major health risks. Plastic items should be banned all over the world, and recyclable substitutes should be provided to address these dangerous issues.[9]

Many European countries have introduced various laws to discourage the usage of plastic bags by imposing fines and heavy penalties or to outright prohibit the making including the use of plastic bags to reduce pollution. Even if a ban on the manufacture of plastic bags will enhance agricultural output, a few nations are still hesitant to enact legislation owing to dishonest and immoral pressure imposed on their governments indirectly.

As a result, individuals continue to use these plastic bags to a considerable degree.[10] Pakistan has become the 128th country to prohibit plastic usage but unfortunately, implementation is poor so far. In Sindh ban existed since 2014 under the Sindh Prohibition of Non-Degradable Plastic Products Rules and the Sindh Environmental Pollution Act. But still, our country is confronted with environmental pollution due to a lack of effective government strategies. Our country must make it easier for consumers to switch from plastic bags to eco-friendly recyclable materials. The purpose of the study was to assess secondary school students' knowledge, attitudes and practices regarding the use and disposal of plastic bags and their environmental consequences. It will help concerned educational authorities to improve.

2. Materials & Methods

The participants in this descriptive cross-sectional study were secondary school students from different schools in Islamabad, selected through convenience sampling and their consent was taken beforehand. The study duration was 1 year (December 2020 to December 2021).

A sample size of 377 was calculated through Rao software. There were 202 males and 175 females. Inclusion criteria were students of the 8th to 10th class and those who gave consent and filled out the questionnaire. Data confidentiality was maintained.

Participants were enrolled in the study by consecutive non-probability sampling. Data was collected from students of the 8th to 10th class. The questionnaire used was adopted from a study on awareness, acceptance and practice of plastic ban legislation[11] and was modified according to the demographics of our population. Almost 10-15 minutes were required to complete the questionnaire. The questionnaire was translated before distribution and it consisted of four sections; demographic details, questions regarding plastic usage, legislation and disposal of plastic. IBM SPSS Statistics Version 25 was used to analyse data. Frequencies and percentages were calculated. A chi-square test of significance was applied. p-value less than 0.05 was considered statistically significant.

Ethical approval was taken from the ethical approval committee with reference number ERC/ID/47.

3. Results

The research was conducted on adolescents, of age group 12-17 years. 50.7% of the sample population was younger than 15 years of age and 49.3 % were older than the age of 15. Among participants, 53.6% were males and 46.4% were females. About 95% of the sample population considered plastic pollution as a global issue and 97.6% considered it as a contributory factor to environmental pollution. More than half of the sample population i.e. 69.8% got awareness about plastic pollution through mass media while the contribution of schools in this regard was only 43%. 87.3% of participants were willing to raise awareness about plastic hazards to others. More than 3/4th of participants, i.e. 75.6% were aware of the health hazards due to plastic pollution and 85.1% of participants considered plastic dangerous for all kinds of species.

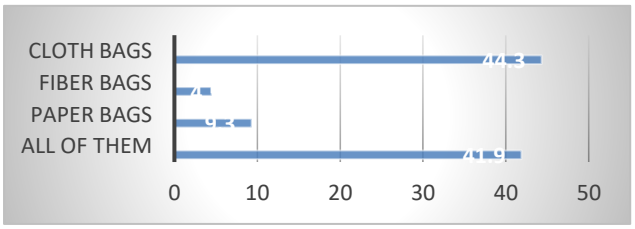

Figure 1: Alternatives to plastic bags

The use of plastic bags and the reasons for their utilization is shown in Table 1.

Table 1: Usage of plastic bags (n = 377)

S. No.	Variables		Frequency	Percent (%)
1.	Use plastic bags	Yes	255	67.6
		No	122	32.4
2.	Reason for the preferred use of plastic bags	Lack of alternatives	139	36.9
		cheap	61	16.2
		Easily available	131	34.7
		Lightweight	46	12.2
3.	Plastic bags are mostly used for	Carrying food	119	31.6
		Dealing with garbage	69	18.3
		Shopping	189	50.1
4.	Handle shopping without plastic bags	Yes	171	45.4
		No	206	54.6
5.	The trend of plastic utilization	Increasing	276	73.2
		Decreasing	101	26.8
6.	If increasing, what reason?	Easy availability	136	49.3
		Cheapness	42	15.2
		Durability	10	3.6
		Lack of community awareness	88	31.9
7.	If decreasing, what reason?	Decreased availability	22	21.8
		Increased community awareness	48	47.5
		Replaced with others	31	30.7

Significant p-values were observed between usage of plastic bags and gender; age; educational level; knowledge about plastic pollution, its hazards and proper disposal.

Also, there were significant associations between plastic bag usage and knowledge about plastic ban legislation and whether they support such legislation. Knowledge about the plastic ban and its disposal is shown in Table 2

Easy availability and lack of alternatives to plastic bags make it easier for our study participants to use them, most commonly for shopping and carrying food purposes.

Table 2: Legislation and disposal (n=377)

S. No.	Characteristic		Frequency	Percentage
1	Knowledge about plastic disposal	Yes	170	45.1
		No	207	54.9
2.	Plastic banning responsibility	Community	191	50.7
		Government	186	49.3
3.	Knows about laws to ban plastic usage	Yes	262	69.5
		No	115	30.5
4.	Support plastic ban legislation	Yes	316	83.8
		No	61	16.2
5.	Can legislation reduce plastic pollution	Yes	348	92.3
		No	29	7.7
6.	A common practice to dispose of plastic	Burning	70	18.6
		Municipal container	104	27.6
		Private collector's	145	38.5
		Open dumping	58	15.4
7.	Organized waste collection	Yes	202	53.6
		No	175	46.4
8.	If not, will you pay to organize it?	Yes	138	78.8
		No	37	21.2

Lack of community awareness also plays a major role in increasing trends of plastic utilization. Most of the participants do not know about plastic disposal but support legislation to ban plastic use to reduce plastic pollution. A significant association was found between usage of plastic bags and gender, age, education, knowledge about plastic bags and their alternatives, support for plastic ban legislation and school role in current perception about plastic bags as shown in Table 3.

Females and age groups of above 15 years use plastic more as compared to males and younger age groups.

Table 3: Factors associated with plastic bags usage

S.No.	Variable	Use Plastic bags (n = 255)		Don't use plastic bags (n = 122)		p-value
		N	%	N	%	
1	Gender					
	Male	127	62.9	75	37.1	0.036
	Female	128	73.1	47	26.9	
2	Age					
	< 15	103	55.4	83	44.6	0.000
	> 15	152	79.6	39	20.4	
3	Education					
	Middle	84	47.5	93	52.5	0.000
	Matric	171	85.5	29	14.5	
4	Knowledge about plastic pollution as a global issue					
	Yes	237	66.2	121	33.8	0.01
	No	18	94.7	1	5.3	
5	Knowledge about health hazards of plastic pollution					
	Yes	184	64.6	101	35.4	0.029
	No	71	77.2	21	22.8	
6	Knowledge about the proper disposal of plastic bags					
	Yes	91	53.5	79	46.5	0.000
	No	164	79.2	43	20.8	
7	Knowledge about plastic bag alternatives					
	Yes	212	65.4	112	34.6	0.026
	No	43	81.1	10	18.9	
8	Knowledge about plastic ban legislation					
	Yes	165	63	97	37	0.004
	No	90	78.3	25	21.7	
9	Support plastic ban legislation					
	Yes	203	64.2	113	35.8	0.001
	No	52	85.2	9	14.8	
10	School role in current perception of plastic bags					
	Yes	88	54.3	74	45.7	0.000
	No	167	77.7	48	22.3	

4. Discussion

Plastic pollution is dangerous for all well-being and it also has a major contribution to environmental pollution. More than 90% of our sample population were well aware of these harmful effects, which is similar to a study conducted by Mohammad Bakri Alaa Hammami which showed that 85.5% of the population knew the harmful effects of plastic on the environment.[12] The subjects in their adulthood may have greater awareness about the damage caused to the environment by plastic products than those of the older ages. This can be due to greater access to the internet and social media. As in this study, most of the population (69.8%) got awareness about plastic pollution through mass media. This was in contrast to the study conducted by Najnin Khanam et al where the majority (83.15%) of the sample population got awareness from schools.[13] A study conducted by Joshua O'Brien et al showed that plastic usage among participants was high which is similar to the results of our study where plastic usage is more than 2/3rd among participants. There can be many reasons for using or preferring plastic bags in the study, most of the participants use plastic bags because of their easy availability, convenience to use and low cost and lightweight.[14] These results are from our study where the majority of study participants used them for similar reasons. To reduce plastic usage, students must know its alternatives. A study conducted by Najnin Khanam et al showed that students have good knowledge about plastic bag alternatives as the majority (80%) of them mentioned cloth bags as their alternatives which is similar to our study where 86% of students have this knowledge.[13] Knowing plastic alternatives is a good thing but practising this should also be considered. There is a need to change the mindset of everyone in the community to promote the use of cloth bags instead of plastic bags. Knowledge about plastic disposal is

important in reducing its pollution. But, most of the students (54.9%)in our study did not know about it. This is similar to a study conducted by Srinivasan et al which showed that only 46 % of students know about disposal while more than half i.e. 54% of students have no information about it.[15] To reduce plastic pollution, knowledge about plastic disposal is an important factor until cloth bag preference prevails in the community. Proper guidance from schools and at the government level through mass media is important in giving them awareness. Also, proper waste collection and disposal on the part of the government side at regular basis must be done. To reduce plastic pollution, the government has taken some steps in the past e.g. banning plastic bag usage and free distribution of cloth bags and other alternatives to the public. A study conducted by Sujitha P. et al showed that the majority (94%) of the participants were aware of legislation on plastic ban and 76% had a positive attitude towards the ban. This is in contrast to our study where 69.5% of students had knowledge about the plastic ban but 84% supported legislation on plastic usage. [11] This is a good sign and shows that if provided the opportunity, they will support legislation on banning plastic products and will prefer cloth bags and others as alternatives. A study conducted by Chung-Sum Lam et al also showed that there is a need to improve legislation on plastic usage to reduce its impact on the environment and human lives. New efficient management strategies should be developed to promote plastic legislation to decrease the incidence of plastic pollution worldwide.[16] A study conducted by Mwazvita T. B. Dalu et al emphasized the necessity of more environmental education programmes to teach at schools about plastic pollution effects, as well as improve awareness about it at the primary and secondary school levels.[17] These results are similar to our study where the majority of study participants use plastic bags although they were aware of their harmful effects. Also, similar results were observed in this and a study conducted by Rida Abid et al where the majority of students had adequate knowledge about the health hazards of plastic use.[18] The significant number of students who were included in this study was one of its most obvious strengths, which may be attributable in part to our use of basic questionnaires that could be completed quickly. As a result, the study's findings may be representative. Furthermore, to our information, this is one of the initial research to look into the awareness of secondary school students regarding plastic pollution, disposal and legislation. Our results may raise concerns about the severity of plastic usage and disposal issues, leading to the implementation of suitable monitoring and measures to control this issue. It is recommended that a regular national campaign should be held to educate the public at large and students about environmental challenges in general and the issues with plastic bag utilization specifically. Alternative carrier bags should be supplied and disseminated on a trial basis to people before a decision is made to prohibit the use of plastic bags. To limit the widespread use of polymeric products, regulatory organizations should employ effective control measures in the form of fines, penalties, or bans.

5. Conclusion

Students were well aware of the hazardous effects of plastic bags on the environment, yet most of them used plastic bags as a part of their daily lives to carry different goods. They also knew about different alternatives to plastic bags.

Different factors that were responsible for the higher usage of plastic bags included a lack of alternatives to plastic bags, easy availability, low cost and lightweight.

CONFLICTS OF INTEREST- None

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Contributions:

M.U.D, Z.A, H.U.N, M.T - Conception of study
M.U.D, Z.A, H.U.N, M.T - Experimentation/Study Conduction
M.U.D, Z.A, H.U.N, M.T, N.Y, T.M - Analysis/Interpretation/Discussion
M.U.D, Z.A, H.U.N, M.T, N.Y, T.M - Manuscript Writing
M.U.D - Critical Review
M.U.D - Facilitation and Material analysis

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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