

Original Research Article

Assessment of awareness about plastic pollution and attitude regarding plastic bags usage among rural population of Kanchipuram, Tamil Nadu, India

Shivashankari Pandirajan, V. Pragadeesh Raja*,
Jasmine Maruthupandiyam, Kalaivani Annadurai

Department of Community Medicine, Shri Sathya Sai Medical College and Hospital, Chengalpattu, Tamil Nadu, India

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***Correspondence:**

Dr. V. Pragadeesh Raja,

E-mail: vpragadeeshraja@gmail.com

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ABSTRACT

Background: Plastic, although a simple synthetic polymer consisting of small molecules (monomers) linked together in a repetitive formation, is extremely versatile; with properties ranging from, resistance to corrosion, light weight, high strength, transparency, low toxicity to durability. The plastic used for domestic purpose nearly 500 billion plastic bags used each year. It is the slow poisoning to human health, animals and also the environment. Some years before plastic usage was few purposes only, over the past 60 years, plastics production and waste have dramatically increased, now days everyone using single use plastic bags for all use including cooked food packing, storage of drinking water and even storage of vegetables. The objective of this to assess the awareness regarding plastic pollution and to assess the attitude regarding plastic bag usage.

Methods: A Community based cross sectional Study conducted among the population of residence, Sembakkam, Kancheepuram district, Tamil Nadu. The study duration between June to July 2019. Data collected through semi structured questionnaire from participants. Data Collected was entered in MS office excel and analyzed in SPSS version 21.

Results: In the study, 67.5% (135) are males and 32.5% (65) are females. Mean age of the participants is 48.22 years (± 14.14). 86.5% (173) are literate and 13.5% (27) illiterate. In the study, participants 71% (142) answered plastic will cause health problem to animals and 24.5% (49) are not aware about health problem due to plastic. At the disposal of plastic 31% (62) replied burning of plastic which is followed by recycling the plastic 28% (56) ($p < 0.05$) is the correct way of disposal. The majority of the participants, 90.5% (181) are supporting the banning of plastics and 5.5% (11) are not supporting the banning.

Conclusions: Plastic usage has become a part of daily life, leading to the countless dumping of plastics. This in turn causes along with the environmental hazards, health hazards to both the humans and animals. The best recommendation is to reduce and reuse the daily usage of plastics. Strict Political and Administrative rules should be implemented and monitored.

Keywords: Plastic pollution, Awareness, Attitude

INTRODUCTION

Plastic, although a simple synthetic polymer consisting of small molecules (monomers) linked together in a

repetitive formation, is extremely versatile; with properties ranging from, resistance to corrosion, light weight, high strength, transparency, low toxicity to durability. Used by almost every industry in the world,

from food packaging to space exploration, plastic is the ultimate commodity of convenience. Household names in the plastic industry include polyethylene terephthalate (PET), polyethylene (PE), polypropylene (PP), polystyrene (PS) and polyvinyl chloride (PVC).¹

The plastic used for domestic purpose nearly 500 billion plastic bags used each year.² It is the slow poisoning to human health, animals and also the environment. Some years before plastic usage was few purposes only, over the past 60 years, plastics production and waste have dramatically increased, now days everyone using single use plastic bags for all use including cooked food packing, storage of drinking water and even storage of vegetables. In Indian homes women's using plastic in their kitchen for storage of raw foods. Current per capita consumption of plastics in India, according to a report of the federation of Indian chambers of commerce and industry (FICCI) published in 2017, is 11 kg per annum, compared to countries such as the US (a whopping 139 kg per capita per annum), EU (65 kg) and China (38 kg).³

Plastic polluted the soil, water and air. In soil tons of plastic every year buried and make soil pollution, that results chemical changes in the soil that lead to unfit for plants to grow and also that prevent rain water reaching the ground level because of that floods. Plastic bags are dumped in drainage and canals so blockage in the normal flow of water, so change in the water quality that favor to the breeding place of mosquito and more chance of water borne disease. In the rainy season blockage due to plastic is the one of the reasons of floods, sometimes that change in the quality of water, chemical changes that dangerous to aquatic animals and plants. Many of tiny plastic particles are swallowed by farm animals or fish who mistake them as food. 8 million tons of plastic end up in the world's oceans every year. In world 10 rivers alone carry 90% of the plastic waste that ends up in the oceans among that 2 rivers Brahmaputra and Ganges from India.⁴

Due to burning plastic it produces fumes that contain toxic pollutants that dangerous to human health and that affect the greenhouse effect that leads to global warming. In 2019, the production and incineration of plastic will produce more than 850 million metric tons of greenhouse gases equal to the emissions from 189 five-hundred-megawatt coal power plants.⁵ Incineration of plastic waste in open fields is a major source of air pollution. About 12 per cent of most municipal solid waste is made up of plastic of one kind or another, and 40 per cent of the world's garbage is burned.⁶ Burning of plastics releases toxic gases like dioxins, furans, mercury and polychlorinated biphenyls into the atmosphere, and poses a threat to vegetation, and human and animal health.⁷ This study was conducted aiming to assess the awareness regarding plastic pollution and to assess the attitude regarding plastic bag usage.

METHODS

The present cross-sectional community-based study conducted among 200 respondents of Sembakkam village in Kancheepuram district. One of the field practice areas of rural health centre of Shri Sathya Sai Medical College and Research Institute. The study period was from June to July 2019 (two months). Persons above or equal to 18 years of age and one person from each house will be included in the study. The houses which were locked during our study period were excluded from the study after three visits.

Sample size of 200 was taken using simple random sampling method. After getting informed consent from the individuals a pre-tested, a semi-structured questionnaire was used for collecting information regarding plastic pollution. The questionnaire contains three sections. Section A deals with socio-demographic profile, section B was regarding awareness about plastic pollution, and section C was regarding attitude about plastic bag usage. All the questionnaires were manually checked and edited for completeness and consistency and were then coded for computer entry. After compilation of collected data, analysis was done using statistical package for social sciences (SPSS), version 21. The results were expressed as proportions. Chi-square (χ^2) test was applied to test the difference across the groups, and $p < 0.05$ was considered statistically significant.

RESULTS

In the socio demographic variables 67.5% (135) are males and 32.5% (65) are females. Mean age of the participants are 48.22 (± 14.14) years. Among the study participants, 86.5% (173) are literate and 13.5% (27) illiterate. 64.5% (129) belonged to nuclear family and 35.5% (71) are joint family. Most of the participants are Hindus 99% (198) followed by Christian 1% (2). Marital status of the population showed that 91.5% (183) are married, 5% (10) are unmarried, 1% (2) are Divorced and 2.5% (5) are widow. In socioeconomic status most of them, are from class I 46.5% (93) and class II 29.5% (59) based on B. G. Prasad classification. Table 1, shows the socio demographic profile of participants.

In this study 88% (176) of study participants responded plastics cause the pollution to environment. 4.5% (9) plastic will not cause pollution and 7.5% (15) responded don't know about plastic causing pollution to environment.

65% (130) participants responded burning of plastic will cause lung problem and 18.5% (37) was not aware about that. Among the study participants 57.5% (115) participants replied plastic usage in various ways will cause cancer, and 33.5% (67) were not aware about that. 67% (134) participants answered plastic using in food package will cause health problem and change nature of the food like taste, smell and 12.5% (25) did not agree

with packing of food in plastic causing any health hazards.

Among the participants 65% (130) responded that plastic will cause soil pollution, and 26% (52) participants don't know about plastic causing soil pollution ($p < 0.001$). In the study participants 71% (142) answered plastic will cause health problem to animals and 24.5% (49) are not aware about health problem due to plastic. In the disposal of plastic 31% (62) replied burning of plastic which is followed by recycling the plastic 28% (56) ($p < 0.05$) is the correct way of disposal.

Table 1: Socio-demographic characteristics of the participants (n=200).

Variables		N	Percentage
Gender	Male	135	67.5
	Female	65	32.5
Religion	Hindu	198	99
	Christian	02	01
Marital	Married	183	91.5
	Unmarried	10	5
	Divorced	2	1
	Widow	5	2.5
Socio economic status	Class I	93	46.5
	Class II	59	29.5
	Class III	18	9.0
	Class IV	17	8.5
	Class V	13	6.5
Type of Family	Nuclear	129	64.5
	Joint	71	35.5
Education status	Literate	173	86.5
	Illiterate	27	13.5

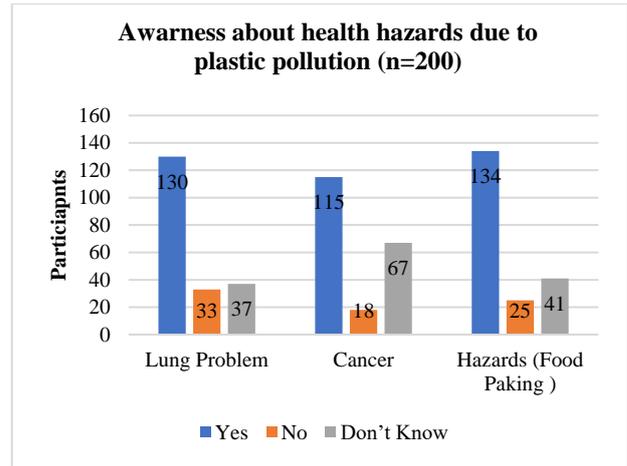


Figure 1: The awareness regarding health hazards due to plastic pollution.

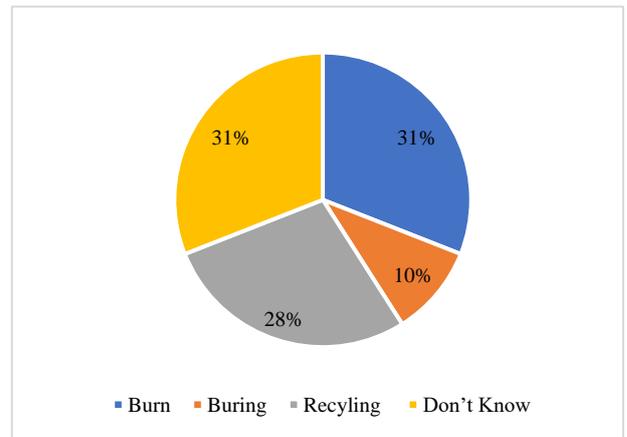


Figure 2: The disposal of plastic.

Table 2: Shows the association between awareness about plastic pollution and hazards.

Lung problem due to plastic pollution				P value
Awareness about plastic pollution	Yes	No	Don't know	0.111
Yes	114	30	32	
No	6	3	0	
Don't know	10	0	5	
Cancer due to plastic pollution	Yes	No	Don't know	0.002
Yes	104	16	56	
No	7	2	0	
Don't know	4	0	11	
Health hazards due to packing of food in plastic	Yes	No	Don't know	0.000
Yes	122	20	34	
No	3	5	1	
Don't know	9	0	6	
Plastic hazards to animals	Yes	No	Don't know	0.000
Yes	131	8	37	
No	8	1	0	
Don't know	3	0	12	

69.5% (139) participants are using plastic bags and among them 66.1% (92) are using plastic bags because of convenience, 26.7% (37) are using it because they are

available in free of cost and in less cost, 3.6% (5) are using for no need take own bags and 3.6% (5) had no idea.

Among plastic bag using participants 53.2% (74) are using less than 5 bags per week, 25.2% (35) participants are using more than 10 bags per week and remaining 21.6% (30) participants are using 6 to 10 bags per week. Majority of the participants 90.5% (181) are supporting the banning of plastics and 5.5% (11) are not supporting the banning.

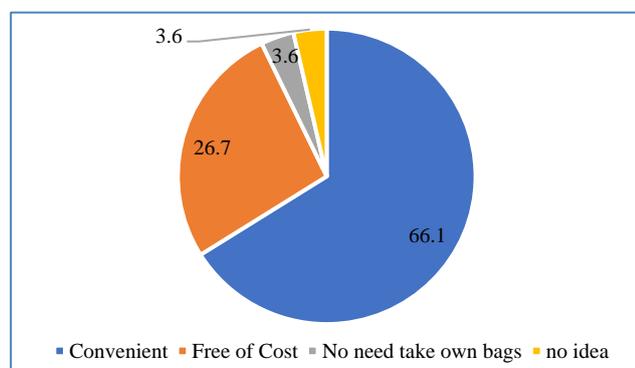


Figure 3: Reason for using plastic bags (n=139).

DISCUSSION

The present study was a cross sectional study conducted among 22 study participants. The study showed that 88% of the participants are aware of the Environmental hazard due to the usage of plastics. This is in accordance with the study done by Hammami et al which showed that 85.5% understood the harmfulness to the environment due to the usage of plastics.⁸ Similar result was shown in a study conducted by Adane et al.⁹

This study showed that 65% were that usage of plastics can cause lung problems and 57.5% had knowledge about the plastic as a causal factor for various cancers. Similarly, a study done by Thiruketheeswaranathan et al which showed that 78% of the participants were about the environmental and the health hazards of the plastic usage.¹⁰

The present study stated that 31% of the study participants responded that burning is the correct way of disposal. This is slightly lower than a study done by Kakoti et al which showed that 56% responded burning as the proper disposal of plastic waste.¹¹ This study also showed that almost 65% of the study participants were aware that plastic causes soil pollution. This is in contrast with the study done by Kakoti et al which showed that only 40% were about the same.¹¹

On analysing the reason for the usage of the plastic eve with the awareness about the health and environmental hazards, this study stated that almost 66.1% are using the plastics because of easy availability and convenience. Similar result was shown in the study done by Kakoti et al which stated that 60% of the participants are using the plastics because of the easy availability.¹¹

CONCLUSION

Plastic usage has become a part of daily life, leading to the countless dumping of plastics. This in turn causes along with the environmental hazards, health hazards to both the humans and animals. The best recommendation is to reduce and reuse the daily usage of plastics. Strict political and administrative rules should be implemented and monitored. Educating the people on the same is also recommended.

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