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Perception Regarding Hazards of Plastics Usage and Effectiveness of Plastic Ban in Rural Tamil Nadu

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ABSTRACT

Background: Plastics have become part of our modern lives and the amount of plastics produced in this decade equals the amount produced in the last century. Unless we control the production and usage of these plastics, the consequences will be drastic. The study was planned to find the perception regarding the hazards of plastics and also to assess the effectiveness of the plastic ban imposed in Tamil Nadu state.

Methodology: A cross-sectional study was conducted among adult participants in a rural area (Poonjeri village) of Kanchipuram district in Tamil Nadu. Details regarding basic socio-demography, perception regarding plastics and practices related to plastic ban were collected using a pre-tested questionnaire.

Results: The study included 122 participants of which 23.8% were illiterates and 59.8% were unskilled workers. Major usage form of plastics was plastic covers and they were of the opinion that plastics can lead to cancer, diseases, environmental pollution, etc. 95.1% were aware of the plastic ban and there was difference in awareness about the banned items. Many have stopped using the banned plastics, but 35% were still using plastics for food packing, etc. Plastic wastes were dumped (33.62%) or burnt (21.55%), apart from disposal by local bodies.

Conclusion: Even though the awareness about the plastic ban is high among the population, the usage of banned materials is still there. Adequate number of alternatives to be made available and awareness to be created about the same.

Keywords: Plastics, environment, pollution, ban, bio-degradable.

INTRODUCTION

Plastics have become the most used material in this modern world, because of its convenience and affordability. But on the flip side, they pose a serious threat to the world in the form of environmental pollution with serious consequences.[1] Plastics take a very long time to decompose (100-1000 years), which in turn leads to air, water and soil pollution. The various compounds used in plastics such as phthalates, Bisphenol A (BPA), polyhalogenated compounds, etc. cause various health problems. BPA has been found to be associated with infertility, obesity, polycystic ovarian disease in women and even cancers in animal studies. Phthalates are found to be associated with testicular dysgenesis in males, cryptorchidism and reduced anogenital distance.[2,3]

As per Central Pollution Control Board report (2017) in India, we generate more than 25000 tonnes of plastic waste a day. To tackle this plastic menace, India passed the plastic waste management rules in 2011, which was later amended in 2016 and 2018. These rules stress upon complete ban of plastics less than 50-micron size and also lays down strict guidelines for manufacturers, importers and brand owners for proper management

of plastics.[4] Almost all the states and union territories in India have banned the use of plastic bags. Tamil Nadu was the fourth state in India to implement the ban on single use plastic items from January 1, 2019.[5]

This study was planned to find the perception regarding the hazards of plastics and also to assess the effectiveness of the plastic ban imposed in Tamil Nadu state. The study also tried to explore the various ways to improve the effectiveness of the implementation of plastic ban.

METHODOLOGY

The study was a community based cross-sectional study which was conducted in Poonjeri village in Kancheepuram district. The study was conducted during the first two months of the year 2019. The adults in the study area were included in the study and those who were not willing to take part were excluded from the study. Since there were previous similar studies, assuming the awareness levels to be 50%, the sample size was calculated using the formula, $N = Z\ \alpha^2\ p \times q / d^2$ and the minimum sample size was taken as 110, assuming 10% non-response rate. From the family registers available with the local health authorities, list of adult population in the area was obtained and the study participants were selected using computer generated random numbers.

The study used a pre-tested and semi-structured questionnaire which consists of the following parts: a) Socio-demographic details, b) Perception regarding plastic hazards and its ban, c) Practices related to plastic ban. After obtaining permission from the Institutional Ethics committee, informed consent was obtained from the study participants, and they were assured of confidentiality. Details were collected using the questionnaire and data was entered in Microsoft Excel and analysis was done using SPSS 16.0 software.

RESULTS

The study included 122 participants of which 96 (78.7%) were males and 26 (21.3%) were females. 54.1% were in the age group of 21-40 years and 27.9% were ages 41-60 years. 23.8% of the study population were illiterates and 15.6% were graduates. Majority of the population (59.8%) were unskilled workers. 51.6% of the study population were belonging to lower middle class as per Modified BG Prasad classification and 29.5% were under lower class. (Table 1)

51.6% of the participants say they used plastics mainly as covers or bags. Apart from plastic covers, participants were using plastics in the form of bottles, milk packets, boxes/containers and fish nets. 30.3% think that there are no hazards due to use of plastics. Hazards that can occur due to plastics reported by participants were cancer/ other diseases (38.5%), pollution (22.1%) and harm to animals (9%). 68% of the participants told that plastics won't get decomposed. Of the remaining participants only 7.69% were of the opinion that it will take >100 years to decompose. (Table 2)

95.1 % were aware about the ban imposed on the use and throw plastics in the state. 54.31% were of the opinion that plastic bags, cups, straws and food wrappers were the items banned. 23.28% told only plastic bags were banned. Many were aware about the alternatives such as paper, cloth, jute bags (20.69%), added to that aluminium foil, glass, metal, ceramics (36.21%) and areca nut plates, plantain & lotus leaves (8.62%). Among those were aware of the ban, 92.24% think that the ban was an essential one. (Table 2)

Plastic covers were the most common materials to have been stopped for usage after the ban (46.55%), followed by plastic bottles, cups & straws (30.17%). But 13.79% were continuously using the banned materials even after the ban.

Table 1: Socio-demographic details

Variable	Frequency (%)(n=122)
Sex	
Male	26 (21.3)
Female	96 (78.7)
Age wise distribution	
<21	12 (9.8)
21-40	66 (54.1)
41-60	34 (27.9)
>60	10 (8.2)
Educational status	
Illiterate	29 (23.8)
Primary	27 (22.1)
Secondary	35 (28.7)
Higher secondary	12 (9.8)
Graduate	19 (15.6)
Occupation	
Student	5 (4.1)
Unemployed	6 (4.9)
Unskilled	73 (59.8)
Semi-skilled	19 (15.6)
Skilled	14 (11.5)
Professional	5 (4.1)
Socio-economic class	
Lower	36 (29.5)
Lower middle	63 (51.6)
Upper middle	18 (14.8)
Upper	5 (4.1)

Table 2: Perception regarding plastic hazards and its ban

Question with response	Participants (%)
Purposes for which you use plastics daily (N=122)	
Covers/ bags only	63 (51.6)
Covers, bottles, milk packets	26 (21.3)
Covers, bottles, cups, buckets, dust bins	16 (13.1)
Covers, boxes, cans, containers, fishnets, buckets, bottles	17 (13.9)
Hazards that can occur due to use of plastics (N=122)	
No hazards/ don't know	37 (30.3)
Cancer	16 (13.1)
Other diseases	31 (25.4)
Pollution, non-biodegradable	27 (22.1)
Harmful to animals	11 (9)
Whether plastics get decomposed? (N=122)	
No	83 (68)
Yes	39 (32)
Time taken by plastics to decompose (N=122)	
Don't know	116 (95.1)
<11 years	2 (1.6)
11-100 years	1 (0.8)
>100 years	3 (2.5)
Awareness about the ban imposed on use and throw plastics in the state (N=122)	
No	6 (4.9)
Yes	116 (95.1)
Awareness about the plastic materials banned (N=116)	
Plastic bags	27 (23.28)
Plastic bags, cups, straws & food wrappers	63 (54.31)
Plastic bags & food wrappers	24 (20.69)
Don't know	2 (1.72)
Awareness about the alternatives for banned plastics available (N=116)	
Paper, cloth, jute bags	24 (20.69)
Paper, cloth, jute bags, aluminium foils, glass, metal, ceramic/ earthen wares	42 (36.21)
Paper, cloth, jute bags, plantain leaves, lotus leaves, areca nut plates	10 (8.62)
Paper, cloth, jute, leaves, areca nut plates, glass, metal, ceramics	39 (33.62)
Don't know	1 (0.86)
Do you think the plastic ban was essential? (N=116)	
Yes	107 (92.24)
No	9 (7.76)

Table 3: Practices related to plastic ban (N=116)

Question with response	Participants (%)
Plastic materials you have stopped using after the ban	
Covers/ bags only	54 (46.55)
Bags, bottles, cups, straws	35 (30.17)
Covers, boxes, cans, containers	11 (9.48)
Not stopped	16 (13.79)
The alternatives for plastics you have started using	
Paper, cloth, jute bags	53 (45.69)
Paper, cloth, jute bags, aluminium foils, glass, metal, ceramic/ earthen wares	34 (29.31)
Paper, cloth, jute bags, plantain leaves, lotus leaves, areca nut plates	9 (7.75)
Paper, cloth, jute, leaves, areca nut plates, glass, metal, ceramics	14 (12.07)
Don't know	6 (5.17)
Purposes for which you still use plastics	
Bags and covers	18 (15.51)
Food & groceries- packing and storage	17 (14.65)
Boxes, cans, toys	15 (12.93)
Water bottles, milk packets, water cans	19 (16.38)
Stopped using	47 (40.52)
Places in which you still use/get the banned use and throw plastic materials	
Shops / markets	28 (24.14)
Hotels	10 (8.62)
Don't know	78 (67.24)
Method of disposal of used plastics	
Burning	39 (33.62)
Collection by local bodies, Public dispose vehicles	52 (44.83)
Dumping	25 (21.55)

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Suggestions for better implementation and improving the compliance for the plastic ban	
No suggestions	27 (23.28)
Strict laws	31 (26.72)
Awareness programmes	50 (43.1)
Better/ cheaper alternatives	8 (6.9)

Nearly half of the study population have started using paper, cloth & jute bags (45.69%). 35.16% of the study group were still using single use plastics for food & groceries packing /storage and 16.38% were using single use plastic bottles. They were still using/ getting the banned materials in shops (24.14%) and also in hotels (8.62%). (Table 3)

Even though 44.83% of them dispose the plastic wastes via local bodies waste collection system, the remaining either burn (33.62%) or dump (21.55%) the plastic wastes near their houses. Many were of the opinion that more awareness campaigns (43.1%) to be conducted to improve the compliance of plastic ban, 26.72% were suggesting to have strict laws to better implement ban an 6.9% wanted to have better affordable alternatives. (Table 3)

DISCUSSION

From the study it was seen that plastic bags were the most common plastic materials used day to day. The study found 95.1% of the participants were aware of the ban on single use plastics and many have stopped using the same. In a study conducted in Malaysia, by having a "no plastic bag day" program, they found that 52.3% have used alternate materials.[6] Similarly in United states, 95% of the ordinances passed in relation with plastics were for ban on single use plastic bags. For many of those ordinances, mandatory fee for use of paper bags or reusable bags.[7]

With regards to disposal of the plastic wastes, people either burn (33.62%) or dump (21.55%) the wastes. Environmental experts suggest the fact that the management of plastic wastes should take into consideration the entire life cycle of plastics. Mechanisms to separate and treat bio-degradable & recyclable plastic wastes to be established.[8] Most of the study participants have accepted the ban on single use plastics and they want the government to take steps in increasing the awareness among the people regarding the ban. They also stressed on the proper implementation of laws to enforce the ban for better results. Better availability of affordable alternatives to banned plastics was also a major concern.[9-10]

CONCLUSION

The study found the fact that people were aware of the ban imposed on the use of single use plastics in Tamil Nadu state and many have stopped using the same. But there are people still using the plastic materials for various purposes and there is a need for increasing the awareness levels among them. Also, the ban should be implemented strictly and periodical revisions to be made in the law as per the need. The ban has to be extended to include the proper segregation and management of plastic wastes in order to avoid environmental pollution. Plastic waste management should include the 5 Rs namely, "Reduce, Reuse, Recycle, Recover and Redesign."[9] Bio-degradable polymer plastics and other plastic alternatives to be made available at affordable cost. Further multi-centric studies are needed to assess the impact and improvisation of the ban periodically.

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