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Impact of awareness on the solid waste generation trend: A case study of A.G. colony, Shaktinagar (Jammu, India)

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Abstract

This paper deals with the impact of awareness on the qualitative and quantitative status of solid waste in A. G. Colony, Shaktinagar, Jammu. About 30% houses were randomly selected and the data regarding solid waste generation were collected in two phases. Phase-I comprised the qualitative and quantitative measurement of solid waste generated in the study area. During this phase, awareness regarding the waste minimization techniques was imparted to the individuals with the help of a structured questionnaire. Phase-II involved the collection of post-awareness data from the same sample household. The study revealed that there is a considerable decrease in the bio-degradable waste from 171.83 kg to 154.98 kg, in non-biodegradable waste from 35.93 kg to 21.93 kg during the Phase-II, which was attributed to the awareness created among the sample households during the Phase-I. It was concluded that the most important aspect of the waste management would be the awareness of people regarding common waste management practices along with the satisfactory municipal amenities.

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Introduction

Rapid economic and urban growth while expanding personal wealth and raising individual quality of life for some has been offset by the costs of urban deterioration, particularly industrial pollution, wastewater treatment deficiencies, water shortages, inadequate disposal of solid waste and related health and sanitation problems. Solid waste is one of the most visible, immediate and serious environmental problems confronting municipal authorities (Rahman *et al.*, 2000). Resource Conservation and Recovery Act (RCRA) defined solid waste as garbage, refuse, sludge and other discarded materials (Masters, 2004). Generally, solid waste is disposed off in low-lying areas without taking any precautions or operational controls. Unscientific disposal causes an adverse impact on all components of the environment and human health, and serious economic and welfare losses (Jha*et al.*, 2003; Ray *et al.*, 2005; Sharholy *et al.*, 2005; Rathi, 2006).

Management of solid waste is one of the major environmental problems of Indian cities (Sharholy*et al.*, 2008). Some environmental psychologists have attributed the pervasion of anthropogenic environmental problems to maladaptive human behavior and asserted that the solution to these, depend on a proper examination and understanding of human awareness towards the environment (Milfont and Duckitt, 2004). Environmental awareness reflects behavior and understanding of the importance of environment issues. Hence, in the exploration of an alternative approach to influencing human interaction with the environment, the present study has been undertaken to estimate the impact of imparting environmental awareness on the amount of waste generation in A.G. Colony, Shaktinagar, Jammu.

Materials and methods

The study area was a residential colony located in shaktinagar at a distance of about 6 km from the University of Jammu and belonged to Ward no. 29 of Jammu municipality. About 30% houses were randomly selected and the data regarding solid waste generation were collected in two phases. These households were randomly interviewed with the help of a questionnaire. Phase-I involved the qualitative and quantitative measurement of the domestic waste generated in the study area. During this phase, knowledge regarding the nature of waste, waste minimization methods etc. was imparted to the individuals with the help of a structured questionnaire. Phase- II involved the collection of data from the same households after imparting the knowledge related to waste management. All types of wastes were weighed using digital balance. At the time of data collection, number of family members was also recorded. Results of waste generation were expressed as mean solid waste generated/house/day, composition of waste generated/house/day and mean solid waste generated.

Results and discussion

Table 1 shows the daily solid waste generation in the study area before the awareness was imparted to the individuals. Quantitatively, the waste comprised of biodegradable fractions viz. kitchen, textile, and paper waste, non-biodegradable fractions viz. plastic, metal, glass waste and inert material. The total daily waste generated was 6.316kg, out of which biodegradable waste constituted 5.07 kg, non-biodegradable 1.197 kg and inert material 0.049kg. Maximum number of respondents (85%) belonged to age group 34-45 years and almost all of the respondents (99%) belonged to nuclear family. Twenty four percent respondents were illiterate, 31.0% educated betweenclass I-V, 19% were class 10th passed, 17% 12th passed and 9% of respondents were graduate.

The daily solid waste generation in the study area after imparting awareness is depicted in the table 2. The total solid waste came out to be 5.778kg, out of which biodegradable waste was 4.978 kg, non-biodegradable 0.8 kg and inert material was 0.1kg. The daily per capita solid waste generation of 0.01kg was fairly low when compared with the national

average of 0.4 kg. It was also low when compared with other metropolitan cities where the corresponding figures ranged from 1.5 to 3.0 kg (Pappu *et al.*, 2007). There was considerable decrease in the bio-degradable waste from 171.83kg to 154.98 kg and non-biodegradable waste from 35.93kg to 21.93kg. In addition, study revealed decrease in the paper waste from 4.62 kg to 4.23 kg; plastic waste from 4.86kg to 2.53kg and metal waste from 1.97kg to 1.35 kg after imparting knowledge about waste management issues (Table 3).

Table 1. Cumulative solid waste generation for different categories of domestic waste before imparting awareness to the residents of study area.

Waste category	Total daily solid waste generation (kg)	Waste generated/ House/day (kg)	Waste generated/ person/day (kg)	Total monthly solid waste generation (kg)	Total waste generation/house/ month (kg)
A. BIO-DEGRADABLE					
Vegetable Waste	2.47	0.09	0.024	74.26	0.023
Food Waste	0.65	0.02	0.006	119.70	0.006
Fruit Waste	1.87	0.07	0.018	56.10	0.017
Paper Waste	0.02	0.006	19.81	0.006	
Textile Waste	0.06	0.02	0.0006	1.93	0.006
B. NON-BIODEGRADABLE					
Plastics Waste	0.69	0.02	0.006	20.82	0.006
Metal Waste	0.28	0.01	0.002	8.47	0.002
Glass Waste	0.22	0.008	0.002	6.63	0.002
C. INERT MATERIAL	0.04	0.001	0.0004	1.48	0.0004

Table 2. Cumulative solid waste generation for different categories of domestic waste after imparting awareness to the residents of study area.

Waste category	Total solid waste generation (kg)	Total daily solid waste generation (kg)	Waste generated/ House/day (kg)	Waste generated/ person/day (kg)	Total monthly solid waste generation (kg)	Total waste generation/ house/ month (kg)
A. BIO-DEGRADABLE						
Vegetable Waste	14.93	2.13	0.08	0.020	66.11	0.019
Food Waste	3.73	0.53	0.02	0.005	16.51	0.004
Fruit Waste	11.75	1.67	0.06	0.016	52.03	0.015
Paper Waste	4.236	0.60	0.02	0.005	18.15	0.005
Textile Waste	0.341	0.048	0.001	0.0004	1.51	0.0004
B. NON-BIODEGRADABLE						
Plastics Waste	2.53	0.36	0.014	0.0035	11.20	0.003
Metal Waste	1.35	0.19	0.007	0.001	5.97	0.001
Glass Waste	1.07	0.15	0.006	0.0014	4.73	0.001
C. INERT MATERIAL	0.704	0.10	0.004	0.0009	3.11	0.0009

Table 3. Comparative account of total solid waste generated and % composition of waste before and after imparting awareness to the residents of study area.

Waste category	Total solid waste generated before awarness (kg)	Waste composition before awareness (%)	Solid waste generated after awareness (kg)	Waste composition after awareness (%)
A. BIO-DEGRADABLE	171.83	82.12	154.98	86.08
B. NON-BIODEGRADABLE	35.93	17.17	21.93	12.18
C. INERT MATERIAL	1.48	0.71	3.11	1.74
TOTAL	209.24	100	180.02	100

It was observed that during Phase-II, in order to reduce their waste, about 85% respondents preferred to throw waste in dust bins, 10% respondents preferred to reuse their throw away items, 55% preferred to sell them to the waste purchaser. Seventy percent of the respondents sold their papers to kabariwallas,6% preferred recycling of metal wastes while 45% of the respondents still used to throw away the waste in the open drains (Fig. 1). Similar study carried out by Ankita and Dahiya (2000) revealed 36.0% and 44% gain in knowledge about organic and inorganic wastes, respectively. The overall decrease in the solid waste generation may be attributed to adoption of waste management techniques viz. reduction in the paper and plastic used in packaging, selling of paper to kabariwallas and recycling of metal waste after getting knowledge about the solid waste impacts and management strategies through the interactive questionnaire. On the same line, decrease in the generation of bio degradable waste from 29.44 kg to 27.23 kg and non bio degradable waste from 9.21 kg to 7.72 kg due to the awareness created among the sample households was also revealed by Sharma and Malaviya (2013).
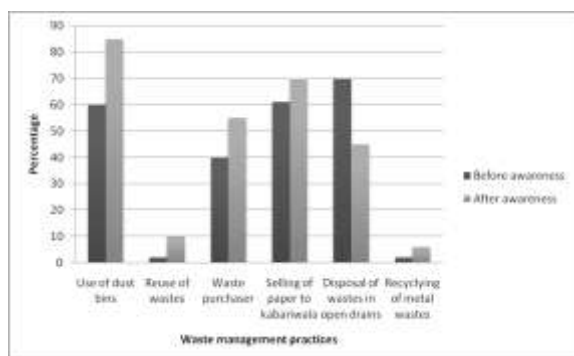

Fig. 1. Impact of awareness on waste management practices.

Conclusion
The study revealed that the waste generated in different households was thrown by people in an open yard, located near the side of a road. This temporary dumping site served as a source of public nuisance, foul smell, feeding and breeding ground for flies, mosquitoes, rodents and other kinds of pathogens which were very dangerous for the health of human beings residing in the area. Another problem caused due to improper dumping of the waste was the blockage of regular water flow in the drains. The solid waste management practices observed in the area were not satisfactory. Thus, it was concluded that satisfactory municipality provisions accompanied by people's awareness was urgently needed in the study area.

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