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Original Research Article

Plastic realities: unpacking public awareness, attitudes and practices regarding plastic usage among residents of diverse backgrounds in Western Maharashtra

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ABSTRACT

Background: Plastic pollution poses a serious threat to ecosystems and human health, particularly in developing countries where a gap often persists between public awareness and sustainable action. Despite a widespread awareness campaign being conducted using different mass media tools, public understanding and behavioural change remain inconsistent. This study assesses the knowledge, attitudes and practices (KAP) regarding plastic use and waste management among residents of an urban community in Western Maharashtra and identifies demographic factors influencing sustainable behaviour.
Methods: A community-based cross-sectional study was performed in 434 participants selected through simple random sampling. Data were collected using a validated, pretested KAP questionnaire covering sociodemographic variables, awareness of plastic hazards and waste-handling practices. Statistical analyses were performed using IBM SPSS v26. Descriptive statistics summarized the data, while chi-square tests and multinomial logistic regression identified associations between KAP components and sociodemographic factors.
Results: Almost all participants (96%) recognized plastic pollution as a global issue and 85% supported government regulation. Additionally, 27% were aware of chemical risks, such as Bisphenol A and only 20% were aware of the quantity of plastic waste produced locally. Education showed a significant association with knowledge and attitudes, whereas age and occupation influenced certain waste-management behaviours.
Conclusions: The study revealed strong general awareness but weaker specific knowledge and inconsistent eco-friendly practices. Educational status emerged as the determinant of environmental literacy. Strengthening community-based education, promoting affordable alternatives and reinforcing waste-management systems are vital to transform awareness into sustained behavioural change.

Keywords: Bisphenol A, Plastic pollution, Sustainable behaviour, Urban community, Waste management

INTRODUCTION

Over the years, plastic pollution has emerged as one of the biggest environmental issues. It affects both terrestrial and aquatic ecosystems. With increasing plastic production, waste generation has risen proportionally, threatening biodiversity, human health and the environment.[1] Each year, more than 2 billion tons of plastics are made worldwide and a significant portion ends up in the environment due to poor waste management.[2] The problem is more severe in developing countries, where systems for managing plastic waste are often inadequate. This leads to more pollution in rivers, oceans and cities.[3] Microplastics, which are tiny plastic particles that come from breaking down of larger plastic items, have entered food chains, drinking water and even the air we breathe. Studies have detected microplastics in human blood and brain tissue, suggesting systemic

exposure.[4] The ongoing exposure to microplastics could harm human health, causing issues like hormone disruption, cancer risk and breathing problems.[5] Additionally, plastics often contain harmful chemicals such as phthalates and bisphenol A (BPA). These substances can percolate into the environment, worsening health risks.[6] Therefore, dealing with plastic pollution is essential for protecting both ecosystems and public health, as also identified by the World Health Organization and UNEP.[7] Although this study does not assess exposure directly, understanding public awareness of such risks provides insight into perceived health concerns.

Public responses to plastic pollution are shaped by socioeconomic factors, education and access to affordable alternatives. Though there is a high level of awareness regarding plastic waste in urban areas, the willingness to reduce plastic use is often hindered by the lack of accessible and affordable alternatives.[8,9] A 2024 field analysis from Pune, India, found that while 99% of households practised waste segregation, single-use plastic bags still dominated waste streams due to consumer demand and low enforcement of bans.[10] Global frameworks like the UNEP Global Commitment to Eliminate Plastic Pollution at the Source aim to phase out problematic single-use plastics and promote reuse models by 2030, aligning with Sustainable Development Goals 6, 12 and 14.[11] Additionally, Local studies, environmental education, community initiatives and policy interventions have a significant impact on public attitudes towards plastic use and waste management. Despite the risks, public awareness about plastic pollution and its impacts varies widely across different groups.[12]

This study aims to assess the public's understanding of plastic pollution, their attitudes towards it and the practices they adopt to mitigate it. By examining the relationship between knowledge, attitude and practice, this study also tries to identify gaps between awareness and behaviour and would shed light on the social drivers of plastic use and provide actionable recommendations for promoting sustainable behaviour. Ultimately, it aims to foster a shift towards more eco-friendly practices, encouraging individuals and communities to actively participate in reducing plastic pollution.

METHODS

Study design and setting

A community-based cross-sectional study was conducted between August 2024 to January 2025 among residents of an urban community belonging to diverse backgrounds to ensure a comprehensive understanding of KAP across different demographics in Western Maharashtra. The study area comprised a heterogeneous population, including residents from urban slum clusters, students residing within the locality and families from the cantonment board jurisdiction. This mix of populations provided diversity in educational and socioeconomic backgrounds, suitable for assessing variability in knowledge, attitudes and practices (KAP) related to plastic use and waste management.

Sample size and sampling technique

The sample size was determined using the formula: n=(Z^2×p×(1-p))/d^2

where Z = 1.96 (95% confidence level), p=0.5 (assumed proportion of KAP of plastic usage for maximum variability) and d = 0.05 (allowable error). The minimum required sample was 384. Considering a 10–15% non-response rate, the target was set at 430 participants and data were successfully obtained from 434 respondents.

A simple random sampling technique was employed. Sampling frames were obtained from local governing bodies. Proportionate representation was ensured across key population subgroups within the community as mentioned above.

Study population and inclusion criteria

The study included residents aged 18 years and above who had lived in the area for at least six months and provided informed consent. Individuals who were critically ill, unavailable during data collection or unwilling to participate were excluded.

Data collection tool

A structured KAP questionnaire was developed to assess knowledge, attitudes and practices regarding plastic use and pollution. The initial set of questions was adapted from open-source KAP tools and other publicly available surveys.[13,14] Items were modified and contextualized to the local population based on pilot findings and expert inputs.

The questionnaire consisted of four sections: sociodemographic details, practices followed to mitigate plastic use, awareness of plastic pollution and attitudes toward its impact. The order of questions was intentionally designed to minimize response bias arising from sensitization. Practice-related questions were asked first to avoid influencing responses through prior exposure to knowledge items. This sequencing helped ensure that participants' answers reflected their usual behaviour rather than being shaped by information encountered during the survey.

Pilot testing and modification

A pilot study was conducted on 10% of the calculated sample (40 participants) from an area with similar sociodemographic characteristics but outside the main study site. The pilot assessed question clarity, comprehension and internal consistency. Based on

participant feedback, several items were reworded for simplicity, redundant items were removed and response options were standardized.

The finalized tool incorporated these modifications after consensus among a panel of faculty experts in community medicine.

Validation and reliability testing of the questionnaire

Content validity was established through expert review by a panel of three specialists in community medicine and biostatistics. The final questionnaire included 14 knowledge, 15 attitude and 12 practice items. Each item was rated for clarity, relevance and simplicity and the content validity index (CVI) for each domain exceeded the acceptable threshold of 0.80. Face validity was confirmed through participant debriefing during the pilot, ensuring that questions were easily understandable in the local language. Reliability of the questionnaire was tested using Cronbach's alpha of 0.82, indicating good internal consistency across the KAP domains.

Data collection procedure

After obtaining informed verbal consent, the validated questionnaire was administered through face-to-face interviews to enhance accuracy and clarify any doubts.

Data management and analysis

Data were entered directly into a Google Form and extracted in Microsoft Excel and analyzed using IBM SPSS version 26.0. Descriptive statistics were used to summarize sociodemographic variables and KAP responses (frequencies and percentages). Chi-square tests were applied to examine associations between KAP variables and sociodemographic factors (age, gender, education, occupation). Multinomial logistic regression analysis was performed to identify independent predictors of significant KAP variables, expressed as adjusted odds ratios (aOR) with 95% confidence intervals (CI). A p value<0.05 was considered statistically significant.

Ethical considerations

Ethical approval was secured from the institutional ethics committee. Data confidentiality was maintained throughout the study. Participation was entirely voluntary, anonymity was maintained and no identifying information was collected.

RESULTS

Sociodemographic

A total of 434 participants were included in the study. The majority belong to the 30–39 years (28.1%) and ≥40 years (29.0%) age groups. Gender distribution was nearly equal, reflecting good representation of both males and females.

Most respondents identified as Hindu, followed by Christians or Muslims consistent with the regional population profile. Educational level varied, though majority had completed middle or high school, nearly one-third were graduates or with a professional degree. In terms of occupation, about 40.1% of participants were engaged in professional or skilled work, 34.6% in elementary, agricultural or other types of employment and 25.3% were unemployed.

These characteristics indicate a diverse mix of age, educational and occupational backgrounds, providing a broad perspective for assessing knowledge, attitudes and practices related to plastic pollution (Table 1).

Distribution of commonly used plastics

In daily life, more than half of both men and women reported using multiple categories of plastic products. Fifty percent of the population were using all kinds of plastics. However, the most frequently used items were plastic containers and carry bags, followed by packaging materials and bottles, while the use of disposable plastics such as straws and cutlery were minimal. Overall, the pattern of use was broadly similar between genders, with only slight variations in specific product types (Figure 1).

Awareness regarding plastic use

Most participants demonstrated high overall awareness about plastic pollution, recognizing it as a major global issue and supporting government regulations and control measures. However, specific technical knowledge—such as awareness of Bisphenol A (BPA) or local waste generation—remained comparatively low (Table 2).

Attitudes regarding plastic use

Attitudes were generally positive, with many supporting policy interventions like charging for plastic bags and promoting eco-friendly alternatives, though uncertainty persisted about the reliability of biodegradable products (Table 2).

Practices regarding plastic use

While good waste disposal practices were common, sustained eco-conscious behaviours such as linking with recyclers or checking BPA-free labels were less frequent, indicating a gap between awareness and consistent sustainable practice (Table 2).

Frequency and reuse pattern of plastic bags

Most participants routinely carried plastic bags while shopping, though their reuse habits varied considerably. While many reused bags a few times, only a small

proportion continued reuse until the bags were no longer usable. A noticeable share of respondents either forgot to carry bags or relied on free ones, indicating that convenience and availability still strongly influence behaviour. Overall, the findings highlight limited commitment to sustained reuse (Figure 2).

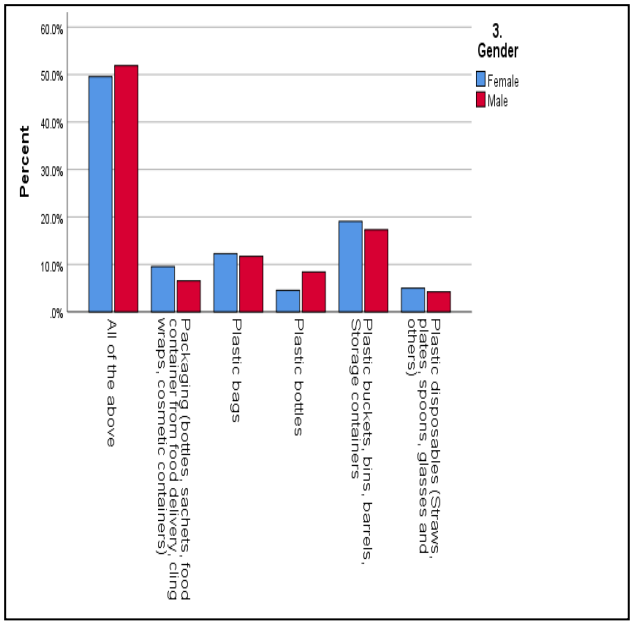

Figure 1: Distribution of commonly used plastic items by gender.

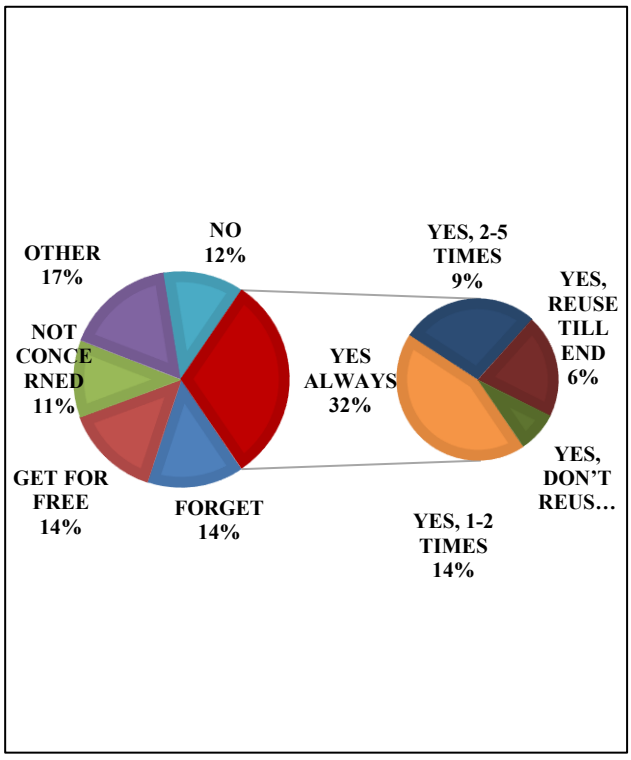

Figure 2: Frequency of carrying and reuse patterns of plastic bags among respondents.

Associations between sociodemographic factors and selected KAP variables

Chi-square tests were conducted to examine associations between sociodemographic variables (age, education and occupation) and selected KAP items on plastic usage. Education emerged as the strongest determinant within the knowledge and attitude domains.

Participants with higher educational levels were significantly more aware of Bisphenol A (BPA) and expressed greater willingness to pay for eco-friendly products (Table 3).

Occupation and age had limited influence overall but showed specific patterns: younger respondents and student groups were more supportive of charging for plastic bags, (Table 4) while participants aged 30–39 years more frequently practiced household waste segregation (Table 5).

No significant relationships were observed between education or occupation for perceptions of the Swachh Bharat movement, indicating these views were uniformly positive across groups.

Predictors of KAP domains: multinomial logistic regression analysis

Multinomial logistic regression (Table 6) was conducted to identify independent predictors of significant KAP outcomes. The results showed that participants aged 30–39 years had significantly higher odds of practising household waste segregation compared to those under 20 years. Awareness of Bisphenol A was strongly linked with higher education, with graduates and above being more knowledgeable than those with primary schooling.

In the attitude domain, students were more likely to report willingness to pay for eco-friendly products, while higher education was unexpectedly linked to lower willingness. Gender and other age categories were not significantly associated with any of the outcome variables.

Table 6 was multinomial logistic regression examining predictors of practices, knowledge and attitudes toward plastics.

Overall, the findings reveal a distinct pattern: while awareness of plastic pollution was almost universal, specific knowledge about chemical hazards such as Bisphenol A remained limited. Education consistently influenced both knowledge and attitudes, whereas occupation and age played a greater role in shaping practical behaviours like waste segregation and willingness to pay for eco-friendly alternatives.

These results highlight an existing gap between awareness and consistent eco-friendly action, indicating that socio-educational factors substantially determine how environmental knowledge translates into daily practice.

Table 1: Sociodemographic characteristics of study participants (n=434).

Variable	Categories	Frequency (N)	(%)
Age group (in years)	<20	91	21.0
	20–29	95	21.9
	30–39	122	28.1
	≥40	126	29.0
Gender	Male	214	49.3
	Female	220	50.7
Religion	Hindu	348	80.2
	Christian	51	11.8
	Muslim	19	4.4
	Others (Buddhist, Sikh, Jain)	16	3.6
Education	Illiterate/Primary	22	5.0
	Middle/High school	190	43.8
	Graduate	126	29.0
	Professional degree	61	14.1
Occupation	Unemployed	110	25.3
	Professional/Skilled	174	40.1
	Elementary/Agriculture/Others	150	34.6

Table 2: Knowledge, attitudes and practices of participants regarding plastics (n=434).

Knowledge of participants on plastics				
S. No	**Responses**	**Yes**	**Not sure**	**No**
1	Plastic pollution a global problem	417 (96.1)	11 (2.5)	6 (1.4)
2.	Aware of amount of waste generated from your city	86 (19.8)	92 (21.2)	256 (59.0)
3.	Aware of government/NGO campaign to reduce plastic waste	156 (35.9)	75 (17.3)	203 (46.8)
4.	Aware of Bisphenol A in plastics and its impact	119 (27.4)	43 (9.9)	272 (62.7)
5.	Government regulation necessary to address plastic pollution	370 (85.3)	42 (9.7)	22 (5.1)
6.	Implementation of deposit-return systems for plastics beneficial	329 (75.8)	67 (15.4)	38 (8.8)
7.	Single- use plastics banned in the state	232 (53.5)	80 (18.4)	122 (28.1)
Attitudes of participants regarding plastics				
8.	Charging a price for plastic bag is good idea	262 (60.4)	67 (15.4)	105 (24.2)
9.	Assure if biodegradable plastics is used	119 (27.4)	166 (38.2)	149 (34.3)
10.	Pay more for environment friendly products	197 (45.4)	182 (41.9)	55 (12.7)
11.	Swachh Bharat movement control plastic pollution	222 (51.2)	147 (33.9)	65 (15.0)
Practices of participants				
12.	Segregate biodegradable and non-biodegradable waste in house	260 (59.9)	59 (13.6)	115 (26.5)
13.	Society ties up with waste recyclers to recycle the plastic wastes	173 (39.9)	104 (24.0)	157 (36.2)
14.	Check Bisphenol A free label on products before buying	67 (15.4)	61 (14.1)	306 (70.5)
15.	Always throw the plastics in dustbin	331 (76.3)	60 (13.8)	43 (9.9)

Table 3: Associations between education and selected KAP questions using chi–square (n=434).

Domain	KAP question	Education χ^2	(df), P
Practice	Segregate biodegradable vs non-biodegradable waste	14.39	(12), 0.27
	Always throw plastics in dustbin	9.84	(12), 0.63
Knowledge	Awareness of Bisphenol A	20.46	(12), 0.005 *
	Awareness of waste generated in city	11.52	(12), 0.48
Attitude	Willingness to pay for eco-friendly products	23.11	(12), 0.027 *
	Charging price for plastic bag	9.66	(12), 0.64
	Swachh Bharat movement helps pollution control	14.78	(12), 0.25

χ^2=Chi-square test statistic, df=degrees of freedom, *p<0.05 considered statistically significant.

Table 4: Associations between occupation and selected KAP questions using chi–square (n=434).

Domain	KAP question	Occupation χ^2	(df), P
Practice	Segregate biodegradable vs non-biodegradable waste	4.42	(2), 0.11
	Always throw plastics in dustbin	5.87	(2), 0.05 *
Knowledge	Awareness of Bisphenol A	0.06	(2), 0.96
	Awareness of waste generated in city	4.12	(2), 0.12
Attitude	Willingness to pay for eco-friendly products	2.53	(2), 0.28
	Charging price for plastic bag	9.54	(2), 0.008 *
	Swachh Bharat movement helps pollution control	2.76	(2), 0.25

χ^2=Chi-square test statistic, df=degrees of freedom, *p<0.05 considered statistically significant.

Table 5: Associations between age and selected KAP questions using chi–square (n=434).

Domain	KAP question	Age χ^2	(df), P
Practice	Segregate biodegradable vs non-biodegradable waste	11.19	(6), 0.08
	Always throw plastics in dustbin	7.02	(6), 0.31
Knowledge	Awareness of Bisphenol A	1.58	(6), 0.95
	Awareness of waste generated in city	13.02	(2), 0.04 *
Attitude	Willingness to pay for eco-friendly products	4.37	(6), 0.62
	Charging price for plastic bag	12.48	(6), 0.05 *
	Swachh Bharat movement helps pollution control	4.96	(6), 0.54

χ^2=Chi-square test statistic, df=degrees of freedom, *p<0.05 considered statistically significant.

Table 6: Multinomial logistic regression examining predictors of practices, knowledge, and attitudes toward plastics.

Predictor	Category	Practice–waste segregation				Knowledge–awareness of BPA				Attitude–willingness to pay			
		Yes vs No		Not sure vs No		Yes vs No		Not sure vs No		Yes vs No		Not sure vs No	
		aOR (95% CI),	P	aOR (95% CI),	P	aOR (95% CI),	P	aOR (95% CI),	P	aOR (95% CI),	P	aOR (95% CI),	P
Gender	Female vs Male	0.63 (0.40–1.00),	0.051*	1.22 (0.65–2.28),	0.53	1.18 (0.64–2.19),	0.59	1.05 (0.58–1.91),	0.87	1.34 (0.74–2.41),	0.34	1.18 (0.65–2.14),	0.59
Education	Graduate+ vs Primary	0.84 (0.42–1.67),	0.617	2.02 (1.04–3.94),	0.037 *	3.22 (1.05–9.85),	0.041	2.11 (0.84–5.28),	0.11	0.22 (0.06–0.81),	0.023*	0.66 (0.22–1.98),	0.46
Occupation group	Student vs Other	0.99 (0.12–8.44),	0.991	1.08 (0.53–2.20),	0.82	0.89 (0.39–2.01),	0.78	1.22 (0.53–2.83),	0.64	2.15 (1.01–4.58),	0.047*	1.32 (0.61–2.84),	0.48
Age group	20–29 vs <20	1.45 (0.79–2.67),	0.23	0.98 (0.51–1.89),	0.95	1.45 (0.75–2.80),	0.26	0.98 (0.49–1.96),	0.95	1.92 (0.88–4.20),	0.10	1.11 (0.53–2.31),	0.78
	30–39 vs <20	2.09 (1.04–4.21),	0.039*	1.62 (0.72–3.66),	0.25	1.12 (0.56–2.23),	0.74	1.25 (0.62–2.54),	0.54	1.38 (0.64–2.98),	0.41	0.95 (0.44–2.07),	0.89
	≥40 vs <20	1.12 (0.58–2.16),	0.74	0.91 (0.41–2.00),	0.82	0.91 (0.44–1.89),	0.82	0.77 (0.36–1.63),	0.50	0.91 (0.41–2.00),	0.82	0.73 (0.32–1.67),	0.46

Note: The dependent variables were: (i) practice – household waste segregation, (ii) knowledge – awareness of bisphenol a in plastics and (iii) attitude – willingness to pay for eco-friendly products. Results are presented as adjusted odds ratios (aor) with 95% confidence intervals forget 14% yes, 1-2 times 14% (ci) and p values. “no” was taken as the reference category for all dependent variables. Statistical significance is shown by- “*”.

DISCUSSION

Knowledge and awareness of plastics

The present study assessed KAP regarding plastic pollution among 434 participants from an urban community. The findings revealed that awareness of plastic pollution as a global environmental issue was almost universal (96.1%). In contrast, studies conducted in other parts of India varied from 42% to 92%.[15,16] Such differences likely reflect variations in literacy level, media exposure, the intensity of regional plastic ban

campaigns, which are state-specific or higher urbanization. There existed a marked gap in technical and localized knowledge, as only 27.4% of respondents were aware of Bisphenol A (BPA) and its health risks, similar to the low awareness levels reported by Sharma et al.[17-19] This discrepancy may be attributed to the fact that public campaigns largely emphasize visible aspects of plastic pollution, whereas chemical hazards such as BPA remain under-represented in mainstream communication. Furthermore, inconsistent BPA-free labelling and limited local discourse on microplastic exposure likely contribute to the low recognition of chemical hazards associated with plastics. This pattern of strong general awareness but weaker specific understanding reflects what has been described in earlier research as the "global–local knowledge divide".[20]

This high general awareness by the participants led to the agreement that government regulation is necessary to address plastic pollution as also stated in study by Datta S et al.[6] In a study conducted in Tamil Nadu about 80% were aware of government bans on single-use plastics, similar to the present study's 85.3% agreement on the necessity of government regulations.[18] However, less than 19.8% were aware of the quantum of waste generated in their own city. The influence of formal education in shaping deeper environmental literacy is consistent with our regression findings. Similar associations have been observed in Malaysia and Bangladesh, where education level consistently correlated with higher environmental knowledge.[21,22]

Our results align with several studies conducted in India and abroad. Likewise, although participants understood the visible and global environmental aspects of plastic pollution, their awareness of invisible, micro-level risks such as particles entering food chain and BPA remained limited.[23] These findings reinforce the notion that while campaigns have succeeded in sensitizing the public to the visible impacts of plastic waste, low awareness of invisible toxicological and physiological threats posed by microplastics and plastic additives continues to persist.

Attitudes toward plastic use and eco-friendly alternatives

In terms of attitudes, 60.4% of our participants supported the idea of charging for plastic bags and nearly half expressed (45.4%) willingness to pay more for eco-friendly alternatives, aligning with findings from Karnataka and Gujarat of 62% and 69% respectively.[24] Still, uncertainty was evident, with over one-third (38.2%) unsure whether biodegradable plastics were truly safer, indicating confusion about the authenticity and availability of eco-friendly options. Students were significantly more willing to pay for eco-friendly products, reflecting heightened sustainability consciousness in younger academic populations. Similar trends have been reported among university students in South Asia and Europe, where peer influence and campus initiatives enhance pro-environmental attitudes.[25] Interestingly, our findings showed that graduates and above were less willing to pay more despite higher awareness, suggesting an "attitude–behaviour gap" reported in global consumer studies, where perceived economic considerations outweigh environmental concerns.[26]

Practices related to plastic use and waste management

Regarding practices, the majority (76.3%) of participants reported always disposing of plastics in dustbins, comparable to the study of Sena et al wherein 71% of respondents reported using appropriate dustbins.[27] This relatively high compliance may reflect enhanced municipal waste-management infrastructure in urban settings, the influence of campaigns such as Swachh Bharat Abhiyan and the possibility of social desirability influencing self-reported behaviour.

In our study, 59.9% segregated waste at home and similar findings were observed, where 43% to 50.4% of households practised waste segregation.[28,29] Middle-aged adults (30–39 years) were more likely to segregate waste, likely reflecting household responsibilities and family roles consistent with prior Indian studies, where these groups showed greater family and civic responsibilities.[23]

However, only 39.9% reported that their societies were tied up with recyclers. Similarly low levels of recycling linkage have been reported in international studies, including Romania.[30] underscoring infrastructural limitations, inadequate municipal–community partnerships and poor awareness about the availability of authorised recyclers. Additionally, recycling systems in many urban areas remain fragmented and households often lack clear guidance on how to connect with certified collection agencies. One of the weakest practices observed was checking BPA-free labels, merely 15.4% when purchasing products, consistent with the low awareness of BPA. Overall, the discrepancy between high awareness and relatively lower adoption of actionable behaviours highlights a clear knowledge–practice gap, consistent with findings from other Indian communities.[31,32]

Sociodemographic predictors and Implications for interventions

Consistent with the overall high awareness observed, targeted interventions are needed to help translate awareness into action. After adjustment, Education consistently emerged as the strongest predictor across KAP domains. This is consistent with prior findings, where higher educational attainment is associated with greater awareness and more positive attitudes toward eco-friendly alternatives.[33] Conversely, age and occupation influenced specific behavioural outcomes such as waste segregation and support for charging plastic bags.

These findings emphasize the need for multi-level interventions. Educational initiatives should focus on expanding public understanding of chemical hazards such as BPA and microplastics. While economic measures like deposit–return schemes to incentivize eco-friendly behaviour, policy measures in a way that provide affordable alternatives, engagement at the occupational level and community programs targeting youth and middle-aged populations to strengthen participation in waste segregation. Strengthening municipal–community partnerships could improve recycling linkages.

Strengths

A major strength of this study is its mixed sample of residents from diverse backgrounds, enhancing generalizability within the region. The use of both descriptive and regression analyses allowed identification of predictors beyond simple associations.

Limitations

However, limitations include reliance on self-reported data, which may have introduced social desirability bias and the cross-sectional design, which restricts causal inference between sociodemographic factors and KAP outcomes.

Future directions

Future studies should incorporate longitudinal or intervention-based designs to assess how awareness translates into sustained behavioural change. Expanding research to include rural and semi-urban areas may help highlight contextual differences in access to waste management systems. Moreover, incorporating environmental literacy modules or digital education interventions could help address the gap between general environmental awareness and specific chemical or policy-level understanding. Linking quantitative KAP data with qualitative insights (e.g., focus group discussions) could further enrich understanding of barriers and facilitators to eco-friendly practices.

CONCLUSION

The findings underline that while the participants recognize plastic pollution as a serious global issue, their knowledge of specific chemical hazards, risks and local waste management realities remains limited. Education interventions remain essential, while occupation and age influence behaviour, emphasizing the interplay between knowledge and action. These findings highlight the need for multilevel, behaviour-oriented public health strategies that move beyond awareness creation towards facilitating sustainable practices and policy adherence at the household and community levels. Bridging the awareness–practice divide through targeted education and stronger waste management infrastructure will be critical to achieving long-term reductions and efforts must focus on converting awareness into sustained, measurable environmental practices.

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