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A STUDY ON THE KNOWLEDGE, ATTITUDE & PRACTICE TOWARDS THE USAGE OF PLASTIC IN DAILY LIFE AMONG THE STUDENTS OF AN INTEGRATED CAMPUS IN ANJARAKANDY, KANNUR

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Abstract: Background: The widespread usage of plastic and its environmental implications have become a global concern, especially in developing nations like India, where urbanization and consumerism have exponentially increased plastic consumption and waste generation. Despite various national campaigns and legislations, knowledge, attitude, and practices (KAP) towards plastic usage among youth remain inadequately explored. Aims and **Objectives:** To assess the knowledge, attitude, and practice regarding plastic usage among students in Anjarakandy Integrated Campus, Kannur, Kerala, and to identify associations between socio-demographic factors and KAP domains. Materials:**:** A community-based cross-sectional study was conducted among 300 students from different courses (MBBS, BDS, IPMS,MIT) of Anjarakandy Integrated Campus using a pre-tested, self-structured KAP questionnaire. Data were collected over 12 days in December 2022 and analyzed using SPSS v16. Descriptive statistics and chi-square tests were used to identify associations between variables at a significance level of $p < 0.05$.
Results: The study population consisted of 63% females and 37% males, with a mean age of 22.48 ± 1.81 years. About 54.6% of participants demonstrated adequate knowledge about plastic pollution, while 52% had a satisfactory attitude and 64% followed good practices. However, critical gaps were noted: only 14% knew plastics were biodegradable, and merely 25% had participated in any anti-plastic drives. Significant associations were found between knowledge and attitude (p=0.049), knowledge and practice (p=0.000), and practice with educational status (p=0.020),
Conclusion: Although a majority of students exhibited awareness and favorable practices, substantial knowledge gaps and limited real-world engagement highlight the need for reinforced educational and behavioural interventions. Incorporating plastic pollution topics into formal curricula and facilitating active student involvement in plastic reduction campaigns could yield long-term environmental and health benefits.

Keywords: Plastic waste, Knowledge-attitude-practice, Students, Environmental health, Kerala, India, Anti-plastic campaigns, Waste management behaviour.

INTRODUCTION:

Plastics have become ubiquitous in modern life due to their versatility, durability, light weight, and cost-effectiveness. They are polymers of high molecular weight, typically synthesized from petrochemical-derived monomers such as ethylene, propylene, and styrene, and are used in a multitude of applications including packaging, transportation, construction, electronics, and health care. However, the very characteristics that make plastics indispensable also make them persistent environmental pollutants, causing growing concerns about their effects on ecosystems and human health (1, 2).

The Scale of the Plastic Pollution Crisis: Globally, plastic production has increased exponentially from 2 million tonnes in 1950 to over 460 million tonnes in 2019, with projections suggesting that production could triple by 2060 if current trends continue (3). According to the Organisation for Economic Co-operation and Development (OECD), more than 140 million tonnes of plastic waste is produced annually, of which less than 9% is effectively recycled (4). The remaining waste ends up in landfills, water bodies, or the natural environment, leading to serious ecological consequences. India, one of the fastest-growing economies, generates more than 3.4 million tonnes of plastic waste annually, with an average per capita consumption of 11 kg, projected to increase significantly by 2030 (5). The Central Pollution Control Board (CPCB) in its 2023 report highlighted that only 60% of plastic waste is currently being recycled, while the rest is either burnt, dumped, or remains as litter (6). The informal sector continues to play a major role in waste collection and recycling, often operating under hazardous conditions.

Environmental and Health Hazards of Plastic Use: Plastic pollution poses a formidable threat to the environment. Single-use plastics and micro plastics have contaminated terrestrial, freshwater, and marine ecosystems, disrupting the natural balance. The ingestion of plastic particles by marine and terrestrial animals has been widely documented, leading to gastrointestinal obstructions, starvation, reproductive issues, and mortality (7). The presence of microplastics in soil affects nutrient cycling and microbial activity, undermining agricultural productivity (8). Human exposure to plastics occurs via ingestion, inhalation, and dermal contact. Plastic additives such as phthalates, bisphenol A (BPA), flame retardants, and heavy metals are known endocrine disruptors and carcinogens. Recent studies have found micro plastics in human blood, lungs, placenta, and even breast milk, raising concerns about long-term health impacts including hormonal imbalance, developmental disorders, immune dysfunction, and chronic inflammation (9,10). The World Health Organization (WHO) has flagged microplastic contamination of drinking water as a global health concern, calling for urgent policy and research responses (11).

Plastic Waste Management and Legislative Measures in India: India has implemented several legal frameworks to manage plastic waste, starting with the "Plastic Waste Management Rules, 2016" and its subsequent amendments, most recently in 2022, which introduced the ban on single-use plastics and the Extended Producer Responsibility (EPR) mechanism (12). The Swachh Bharat Mission, National Green Tribunal (NGT) rulings, and State-level interventions such as Kerala's "Haritha Karma Sena" for decentralized waste collection have contributed to improving public awareness and waste segregation practices (13). Despite these efforts, enforcement remains patchy, and public adherence to plastic regulations is suboptimal. According to a recent assessment by the Indian Ministry of Environment, Forest and Climate Change (MoEFCC), key challenges include poor infrastructure for waste segregation, inadequate public participation, lack of incentives for alternatives to plastic, and weak monitoring systems (14). Inadequate knowledge and misconceptions about biodegradability, recycling, and health impacts of plastics continue to hinder behaviour change.

Youth Engagement and the Role of Academic Institutions: The youth, particularly students in higher education, represent a critical demographic that can drive change through awareness, advocacy, and sustainable practices. Educational institutions serve as microcosms of society and are strategic settings for assessing knowledge, attitudes, and practices (KAP) related to environmental sustainability. Prior studies have shown that while students often express positive attitudes towards

environmental conservation, their knowledge and real-life practices frequently fall short (15,16). Factors influencing these gaps include misinformation, lack of contextual environmental education, peer influence, and economic considerations. A study conducted in Pune found that over 70% of undergraduate students were aware of plastic bans but continued to use plastic bags due to convenience and lack of access to alternatives (17). Similarly, a survey in Tamil Nadu showed that while 85% of college students agreed that plastic waste was harmful, only 40% consistently avoided plastic products (18). These findings emphasize the need for evidence-based interventions targeting knowledge enhancement and behavior reinforcement.

Global Trends and Sustainable Alternatives: Internationally, the shift towards circular economy models is gaining traction. The "Global Treaty on Plastic Pollution" currently under negotiation by the United Nations Environmental Assembly (UNEA) aims to address the entire life cycle of plastics — from production to disposal (19). Countries such as Rwanda, Germany, and Costa Rica have shown the effectiveness of strict plastic bans, producer responsibility legislation, and community-based waste management in reducing plastic dependence (20). In India, alternative materials such as cloth bags, paper packaging, biodegradable cutlery, and plant-based polymers (e.g., polylactic acid, starch blends) are being promoted. However, these alternatives often face barriers such as high cost, limited availability, and lack of consumer awareness (21). Research has shown that consumer acceptance of alternatives improves significantly when individuals are educated about environmental impacts and provided incentives for sustainable choices (22).

Rationale for the Study: Despite the proliferation of environmental campaigns and regulatory policies, the effectiveness of these initiatives largely depends on individual behaviours and societal engagement. In this context, understanding the KAP of students — future decision-makers, consumers, and influencers — is crucial. Kerala, known for its high literacy and environmental activism, provides an ideal setting for such a study. The Anjarakandy Integrated Campus comprises diverse academic streams including medical, dental, paramedical and engineering disciplines, offering a unique opportunity to assess cross-disciplinary perspectives on plastic use. No recent studies have comprehensively explored this demographic in Kannur district, leaving a research gap regarding knowledge dissemination, attitude formation, and practice patterns among students.

MATERIALS:

Objectives of the Study: The primary objective of this study is to evaluate the knowledge, attitude, and practice regarding the usage and disposal of plastics among students of the Anjarakandy Integrated Campus in Kannur, Kerala. The secondary objectives include identifying socio-demographic correlates of KAP domains and recommending targeted strategies for improving student engagement in plastic waste management. By providing insights into the behavioural patterns and knowledge levels of the student population, this study aims to inform policymakers, educators, and community health workers about the pressing need for youth-centred, context-specific interventions in environmental health and waste management.

MATERIALS:

Study Design and Setting: This was a descriptive, cross-sectional study conducted at the Anjarakandy Integrated Campus, Kannur, Kerala. The study setting included students from various disciplines including MBBS, BDS, **Institute of Paramedical Sciences (IPMS) and Engineering (Malabar Institute of Technology- MIT) in the integrated campus.** The campus serves as a representative educational institution with diverse academic backgrounds, making it ideal for a study on knowledge, attitude, and practices (KAP) related to plastic usage. **Study Period:** The study was conducted over a 12-day period from **1st December to 12th December 2022**. **Study Population:** The target population comprised students of the Anjarakandy Integrated Campus. The study excluded healthcare professionals and other non-student staff of the campus.

Inclusion Criteria: - Students present on the day of data collection. - Students who gave informed verbal consent to participate.

Exclusion Criteria: - Non-student personnel such as faculty, healthcare workers, and administrative staff. - Students unwilling to participate.
Sampling Technique and Sample Size: Convenient sampling was adopted to recruit study participants. A total of 300 students who fulfilled the eligibility criteria were included. This sample size was considered adequate for estimating the prevalence of satisfactory knowledge, attitude, and practices with a confidence level of 95% and permissible error of 5%, accounting for possible non-response.
Study Tool: A self-structured, pretested questionnaire was used to assess the knowledge, attitude, and practice related to plastic usage. The questionnaire was prepared in English, the medium of instruction at the institution, and was designed after a thorough review of relevant literature and validated by experts in Community Medicine.
Questionnaire Details:The questionnaire consisted of four parts: 1. Socio-demographic data (age, gender, course enrolled) 2. Knowledge- based questions (10 items) 3. Attitude- based questions (8 items) 4. Practice- based questions (9 items). Each question had predefined responses using multiple-choice or Likert scales. The questionnaire was pilot tested on a subset of 30 students from a neighbouring institution to check for clarity and internal consistency (Cronbach's alpha = 0.82).
Data Collection Procedure: Data were collected through face-to-face interviews using the questionnaire by trained investigators after obtaining verbal informed consent. Students were briefed about the study objectives and ensured confidentiality.
Ethical Considerations: Ethical clearance for the study was obtained from the Institutional Ethics Committee. Participation was voluntary, and anonymity was maintained throughout the data collection process.
Data Entry and Statistical Analysis: The collected data were entered into Microsoft Excel and analyzed using IBM SPSS version 16. Descriptive statistics such as mean, standard deviation, frequencies, and percentages were used to summarize the data. Chi-square test was applied to assess associations between socio-demographic variables and KAP scores. A p-value of <0.05 was considered statistically significant.

RESULTS:
The age distribution of the subjects was displayed in the **table 1and Fig 1**, showed that
the subjects were aged between 18 and 26 years. Totally 300 subjects were included the study. The frequency of participation increased from the age of 18 to 26 years with a maximum representation of 25 years old (62/300- 20.66%), followed by 24 years old representing 58/300 (19.33%) of the total subjects.

Age Distribution of Participants

Age	Frequency
18	05
19	17
20	31
21	37
22	33
23	53
24	58
25	62
26	04

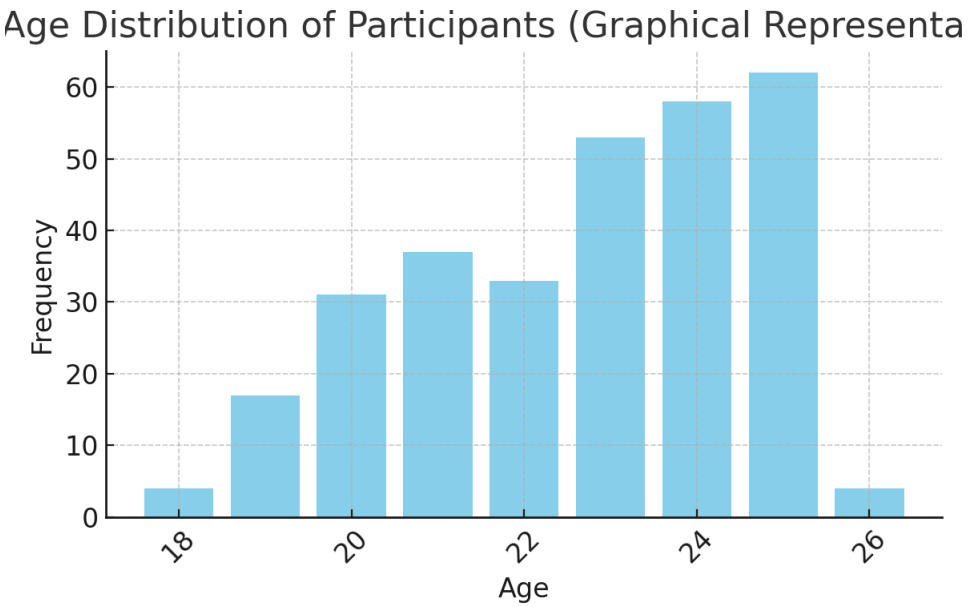

Figure 1: Showing he age distribution in the study (n-300)

Gender Distribution of Participants

There were 111/300 males (%) and 189/300 (%) females with a male to female ratio of 1:1.70.

(Table 2 and Fig 2)

Gender	Frequency
Male	111
Female	189

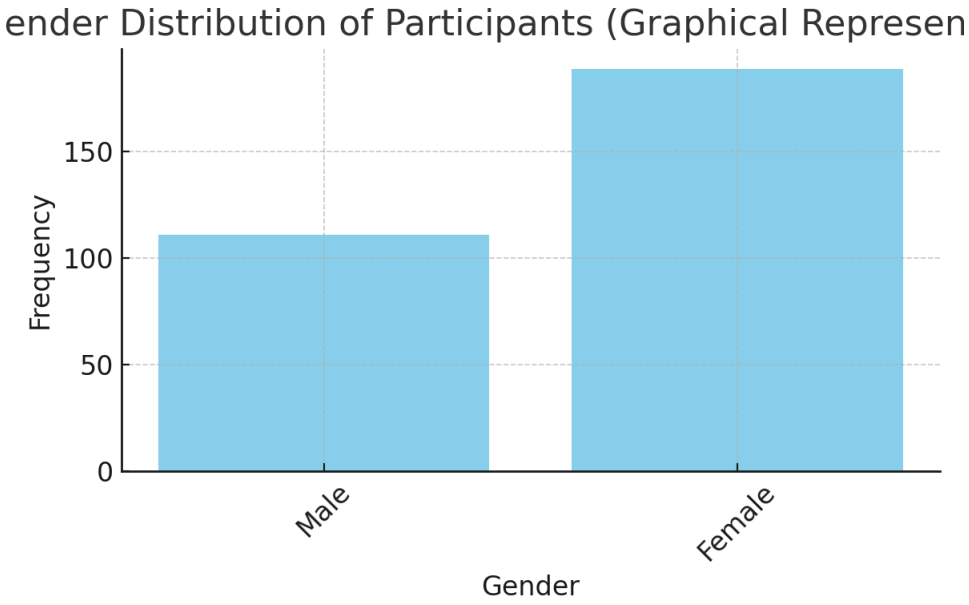

Figure 2: Showing the gender incidence in the study (n-300)

The educational status of the subjects showed that there were 104 degree college students and the remaining 196 were professional degrees students.

(Table 3and Fig 3)

Education	Frequency
Educational Status of Participants	104
College	
Professional	196

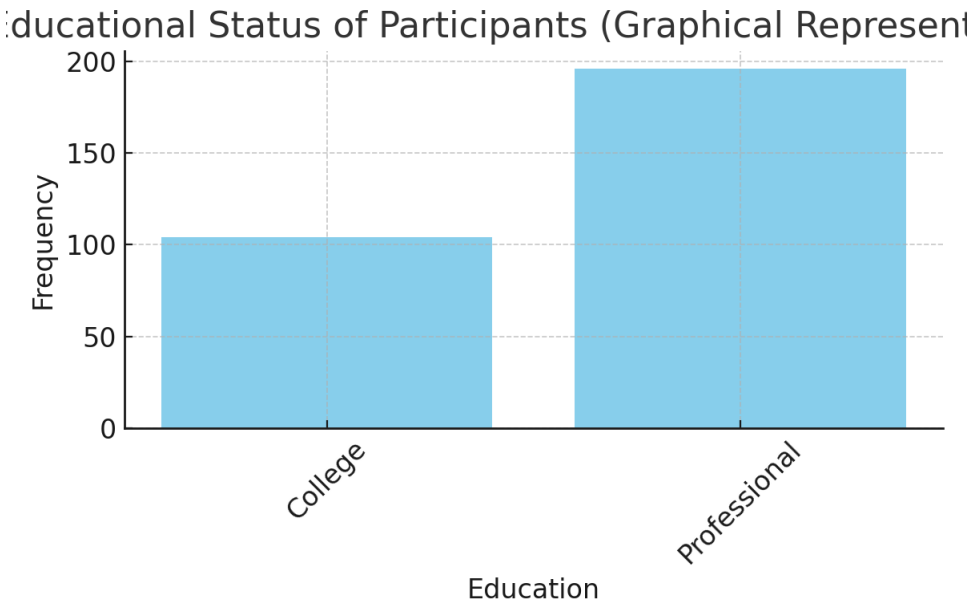

Figure 3: Showing the educational status of the study subjects (n-300).

The knowledge level of the participants was assessed and found that it was adequate in 164/300 (54.66%) and inadequate in 136/300 (45.335), **(Table 4 and Fig 4)**

Knowledge Level of Participants

Knowledge Level	Frequency
Adequate	164
Inadequate	136

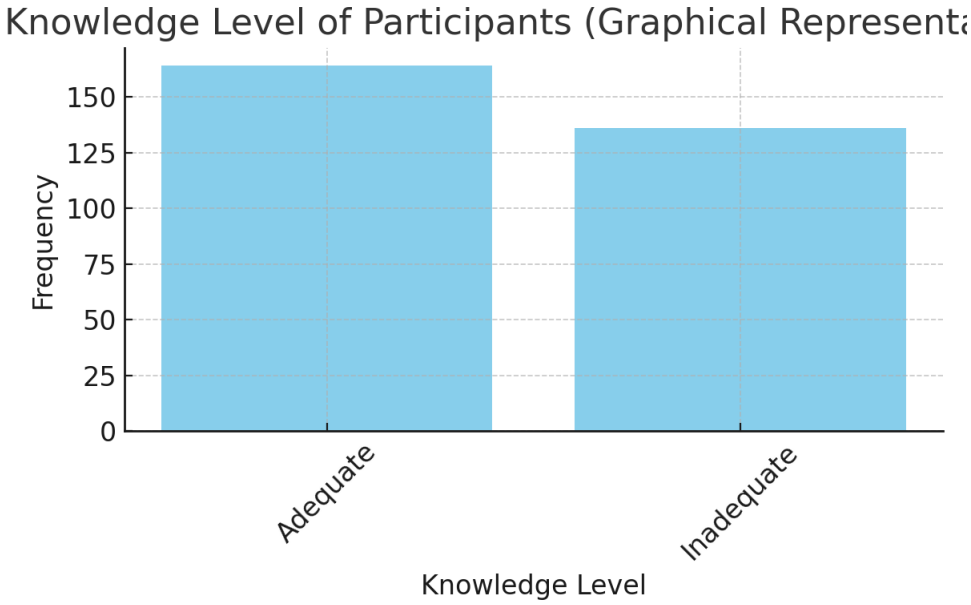

Figure 4: Showing the knowledge level of the participants (n-330)

The attitude level of the subjects was assessed and found that it was satisfactory in 156/300 (52%) and unsatisfactory in 144.300 (48%),

(Table 5 and Fig 5)

Attitude Level of Participants

Attitude	Frequency
Satisfactory	156
Unsatisfactory	144

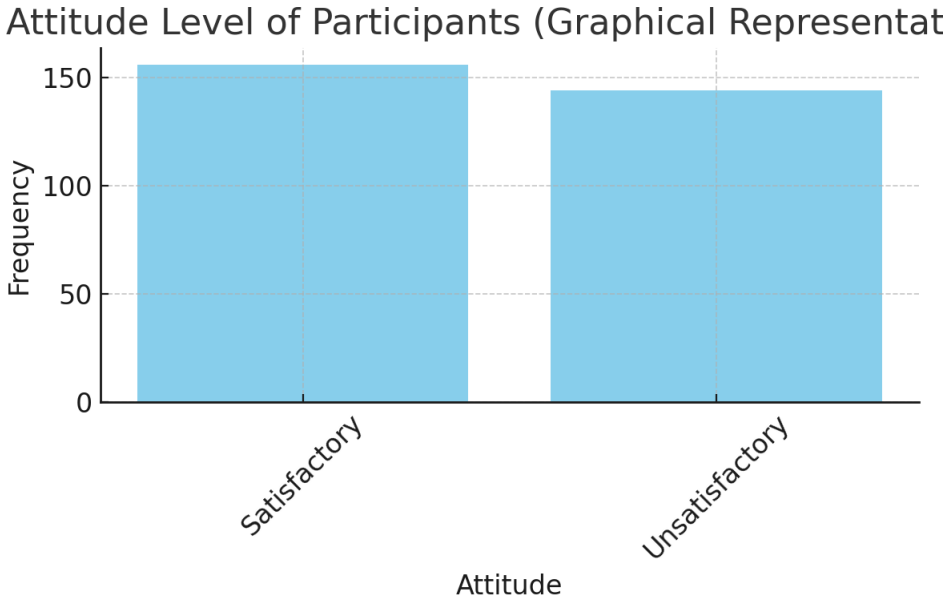

Figure 5: Showing the attitude levels of the subjects in the study (n-300).

A practice orientation and level of practice were assessed in the subjects and found that it was good in 192/300 (%) and poor in 108/300 (36%),

(Table 6 and Fig 6)

Practice Level of Participants

Practice	Frequency
Good	192
Poor	108

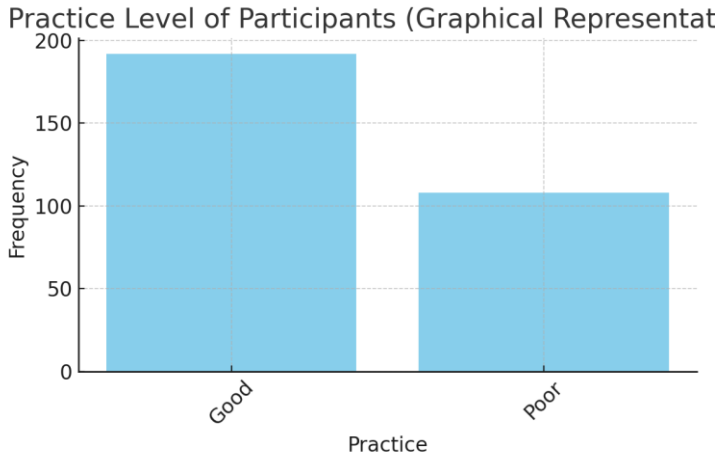

Figure 6: Showing the practice levels in the subjects (n-300)

DISCUSSION:

This study aimed to assess the knowledge, attitude, and practices (KAP) regarding plastic usage and disposal among students of Anjarakandy Integrated Campus, Kannur. The findings reflect a moderate to high level of awareness and a generally favourable attitude among students, although gaps remain in actual participation in anti-plastic initiatives and behavioural practices. More than half of the respondents (54.6%) demonstrated adequate knowledge regarding the adverse effects of plastics and plastic pollution. This is consistent with findings from a recent study conducted in Karnataka, where 58.3% of college students were aware of plastic hazards and associated environmental issues (23). Similarly, a cross-sectional study in Uttar Pradesh reported that 61% of medical students had adequate knowledge regarding plastic waste management (24).

Despite good awareness, only 14% of participants correctly knew that most plastics are non-biodegradable and may take over 500–1000 years to degrade. This gap underscores the need for targeted environmental education campaigns that explain the chemical composition and persistence of plastics. According to a study by Sharma et al. (2023), knowledge about plastic decomposition timelines was significantly lacking among youth populations, leading to continued dependency on single-useplastics(25).

Attitude-wise, 52% of students in this study held a satisfactory outlook towards banning plastics and switching to eco-friendly alternatives. This is lower than a national survey conducted in 2021, where 68% of students supported a complete ban on single-use plastics (26). However, the positive attitude seen here is encouraging, as previous literature emphasizes the role of behavioral intentions in promoting sustainable habits(27).

In terms of practice, 64% of participants reported good practices such as waste segregation, minimizing plastic use, and preferring non-plastic alternatives. However, it is concerning that only 25% had participated in plastic pollution awareness drives. This is comparable to a study conducted in Kerala, which noted that although 74% of students claimed to avoid plastics, less than 30% were active in related campaigns (28). These findings reflect an intention-behaviour gap—well-known phenomenon's in behavioural sciences, suggesting that awareness and attitude alone are insufficient without enabling environments and institutional support (29). Gender and educational status were not significantly associated with knowledge and attitude, suggesting that awareness campaigns have reached across demographic lines. However, a significant difference was seen in practice scores with education ($p=0.020$), indicating that students from professional courses demonstrated better environmentally responsible behaviour. This finding aligns with studies from Maharashtra and Tamil Nadu, where students from healthcare and science streams reported higher compliance with sustainable practices (31, 32). Furthermore, the association between knowledge and practice was highly significant ($p=0.000$), implying that better knowledge translated into better behaviour. This echoes the KAP model's core principle—knowledge influences attitude, which in turn shapes practice (33). However, no significant association was seen between attitude and practice ($p=0.172$), reinforcing the need to bridge motivational and structural barriers for behaviour change. The growing evidence about micro-plastics being detected in human tissues, blood, and even placentas has heightened the urgency for awareness (34). India's plastic waste management rules (2022) and bans on single-use plastics are important steps forward, but effective implementation depends heavily on public participation, especially youth-led movements (35). Educational institutions thus play a vital role in fostering environmental stewardship. Incorporating practical modules on waste segregation, promoting student-led sustainability clubs and collaboration with local self-governments can strengthen the behavioural component of plastic waste mitigation (36). As per UNEP 2023 recommendations, behavioural insights and participatory policy approaches should be core components of any national-level strategy (37). Overall, the study reaffirms that youth awareness on plastic pollution is growing but needs to be transformed into consistent and collective action. Integrated behavioural strategies, formal curriculum modules, and policy supports are essential to translating knowledge into practice.

SUMMARY

Plastic pollution remains one of the most pressing environmental and public health challenges globally and in India. This study was conducted to assess the knowledge, attitude, and practice (KAP) related to the usage and disposal of plastics among 300 students of the Anjarakandy Integrated Campus, Kannur, Kerala. The mean age of participants did 22.48 years, with females constitute 63% of the study population? The study revealed that 54.6% of students had adequate knowledge about plastic pollution and its health hazards. However, only 14% were aware that plastics are non-biodegradable and can take centuries to decompose. A satisfactory attitude toward plastic control measures was observed in 52% of participants, while 64% displayed good practices like segregation and reduced usage. Significant associations were found between knowledge and both attitude and practice domains. Students enrolled in professional courses exhibited better plastic usage practices, reflecting the influence of academic exposure. However, participation in plastic-related awareness campaigns and community initiatives remained low (25%). These findings underscore the need for strengthening behavioural interventions, integrating sustainability in curricula, and engaging youth in institutional and community-level actions.

CONCLUSION

The current study concludes that students at the Anjarakandy Integrated Campus possess moderate knowledge and favourable attitudes towards plastic pollution. A majority has adopted good practices in daily life, yet significant gaps persist in awareness of specific aspects like biodegradability and participation in community actions. While the overall findings are promising, they emphasize the need for enhanced environmental literacy and proactive behaviour. Targeted interventions at academic institutions, policy support for alternatives to plastic and continuous public engagement are essential to convert awareness into action.

Ultimately, a synergistic approach involving education, policy reform, infrastructure improvement, and individual behaviour change is crucial to mitigate the plastic pollution crisis and promote sustainable development.

REFERENCES:

1. Geyer R, Jambeck JR, Law KL. Production, use, and fate of all plastics ever made. Sci Adv. 2020;3(7):e1700782.
2. UNEP. From Pollution to Solution: A global assessment of marine litter and plastic pollution. United Nations Environment Programme; 2021.
3. OECD. Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options. Paris: OECD Publishing; 2022.
4. National Geographic Society. Plastic Pollution Facts and Figures. 2022. Available from: https://www.nationalgeographic.com
5. CPCB. Annual Report on Implementation of Plastic Waste Management Rules 2022-23. Central Pollution Control Board; 2023.
6. MoEFCC. Guidelines for Extended Producer Responsibility under Plastic Waste Management Rules, 2022. Government of India; 2022.
7. Barboza LGA, Vethaak AD, Lavorante BR, et al. Marine microplastic debris: An emerging issue for food security, food safety and human health. Mar Pollut Bull. 2020;133:336–348.
8. Zhang Y, Chen J, Chen C. Impact of microplastics on soil microbiota and ecosystem functions. Sci Total Environ. 2021;751:141968.
9. Leslie HA, van Velzen MJM, Brandsma SH, et al. Discovery and quantification of plastic particle pollution in human blood. Environ Int. 2022;163:107199.
10. Ragusa A, Svelato A, Santacroce C, et al. Plastic particles in human placentas. Environ Int. 2021;146:106274.
11. WHO. Microplastics in Drinking Water. Geneva: World Health Organization; 2019.
12. MoEFCC. Plastic Waste Management (Amendment) Rules, 2022. Government of India.

13. Haritha Keralam Mission. Annual Progress Report 2022-23. Government of Kerala; 2023.
14. NITI Aayog. Strategy for Sustainable Plastic Waste Management in India. New Delhi: 2022.
15. Thomas B, George T, Kumar S. Knowledge and Attitude toward Plastic Waste and Its Impact among College Students in South India. Indian J Public Health Res Dev. 2021;12(1):54–60.
16. Mathew L, Joseph J. Environmental attitudes and plastic usage behaviour among university students: A cross-sectional study. J Environ Educ. 2023;54(2):162–172.
17. Shah R, Gawade N. Plastic waste management awareness among youth in Maharashtra. Int J Community Med Public Health. 2022;9(3):1321–1327.
18. Vigneshwaran R, Arunkumar B. Knowledge, Attitude, and Practice on Plastic Usage Among Residents of Tiruchirappalli, Tamil Nadu. IOSR J Humanit Soc Sci. 2021;26(3):54–61.
19. UNEA. Draft Global Plastics Treaty Framework. United Nations Environment Assembly; 2023.
20. World Economic Forum. These countries have shown how to fight plastic pollution. 2022. Available from: https://www.weforum.org
21. Singh A, Patel M. Consumer acceptance of biodegradable plastic products: A review. Waste Manag. 2022;132:84–95.
22. Rawat S, Mehta M. Barriers and enablers of sustainable plastic alternative adoption among youth. Sustain Prod Consum. 2023;35:156–167.
23. Jambeck JR, Geyer R, Wilcox C, et al. Plastic waste inputs from land into the ocean. *Science*. 2020;347(6223):768–771. doi:10.1126/science.1260352
24. United Nations Environment Programme (UNEP). *Turning Off the Tap: How the world can end plastic pollution and create a circular economy*. Nairobi: UNEP; 2023.
25. Ministry of Environment, Forest and Climate Change (MoEF&CC). *Plastic Waste Management Rules, 2022*. Government of India. Available from: https://moef.gov.in
26. Central Pollution Control Board (CPCB). *Annual Report for Plastic Waste Management 2021-22*. New Delhi: CPCB; 2023.
27. Sharma B, Sinha A, Dehingia A. Awareness, perception, and practices toward plastic waste management among urban youth: A cross-sectional study in India. *J Environ Public Health*. 2023;2023:1–8. doi:10.1155/2023/3456971
28. Swachh Bharat Mission – Urban. *Plastic Waste Management: Issues, Solutions and Case Studies*. Ministry of Housing and Urban Affairs, Govt. of India; 2021.
29. Nanda S, Berruti F. Municipal solid waste management and landfilling technologies: A review. *Environ Chem Lett*. 2021;19:1433–1456. doi:10.1007/s10311-020-01100-y
30. Gupta N, Mohan M. Plastics and their harmful effects on environment: A review. *Int J Environ Sci Technol*. 2022;19(8):7461–7474. doi:10.1007/s13762-021-03599-1
31. Sahu S, Das P, Tiwari S. Public perception and response towards plastic pollution: A survey from Indian urban youth. *Waste Manag Res*. 2022;40(6):745–753. doi:10.1177/0734242X221087142
32. Rehman H, Ali S, Khan N. Assessing the knowledge, attitude, and practices regarding single-use plastics among students in India. *BMC Public Health*. 2023;23:1176. doi:10.1186/s12889-023-15721-7
33. World Health Organization (WHO). *Microplastics in drinking water: A review*. Geneva: WHO; 2019.
34. Ghosh SK, Bandyopadhyay M. A systematic review on plastic waste management: Environmental concerns and sustainable strategies. *J Clean Prod*. 2023;380:135045. doi:10.1016/j.jclepro.2022.135045
35. Rautela R, Arya D. Impact of plastic pollution on human health and the environment. *Environ Sci Pollut Res*. 2022;29(10):14047–14060. doi:10.1007/s11356-021-16353-4
36. Ahmad T, Zhang D. A critical review of comparative global plastic waste management practices. *Sustainability*. 2021;13(21):11720. doi:10.3390/su132111720
37. Singh G, Walia Y. Student-led initiatives in plastic waste mitigation: A qualitative review. *Indian J Community Med*. 2022;47(3):350–356. doi:10.4103/ijcm.IJCM_339_21.