e-ISSN: 2600-7274

Available online
https://journal.uitm.edu.my/ojs/index.php/EJSSH

ESTEEM Journal of Social Sciences and Humanities
Vol 9, September 2025, 123-138

ESTEEM JOURNAL OF SOCIAL SCIENCES AND HUMANITIES

'No Plastic Bag Day' campaign in Selangor: Effects on consumers' attitudes and behaviours

Shantakumari Rajan[1], Nor Farrahanim Mohd Nasir[2], Siti Norashikin Mohamad Shaifuddin[3*], Alia Azmi[4], Mohd Izwan Masngut[5], Nadiatul Syima Mohd Shahid[6], Nur Rohmah Suwandi[7]

[1,2,3,4,5]*Centre for Environmental Health and Safety Studies, Faculty of Health Sciences, Universiti Teknologi MARA Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor, Malaysia*
[3]*EcoPharmacovigilance, Universiti Teknologi MARA (UiTM), UiTM Cawangan Selangor, 42300 Puncak Alam, Selangor, Malaysia*
[6]*Department of Environmental Health, Faculty of Health Sciences, Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang, Bertam Campus, 13200 Kepala Batas, Pulau Pinang, Malaysia*
[7]*Faculty of Health Sciences, Universitas 'Aisyiyah Bandung, Jl. Banteng Dalam No.6, kel Turangga, Kec. Lengkong, Kota Bandung,40264 West Java, Indonesia*

ARTICLE INFO

Article history:
Received 15 August 2025
Revised 3 October 2025
Accepted 8 October 2025
Published 9 October 2025

Keywords:
Attitudes
Behaviours
Consumers
NPBD campaign
Plastic bags
Selangor

DOI:
10.24191/ejssh.v9i1.5020

ABSTRACT

Excessive use of plastic grocery bags has led to a substantial accumulation of plastic waste, which, if not managed properly, contributes to environmental pollution. To address this issue, Selangor has launched the 'No Plastic Bag Day' (NPBD) campaign, which has been active for over a decade to reduce the use of plastic bags. This cross-sectional study aims to provide insight into how NPBD campaign in Selangor affects customer attitudes and behaviours. An online survey was conducted with 389 participants in Selangor using snowball sampling and distributed via social media. For data analysis, descriptive statistics and linear regression tests were conducted using SPSS version 28. Findings revealed that consumers in Selangor exhibit positive attitudes (mean score: 73% ± 19%) and moderately positive behaviours (mean score: 53% ± 17%) towards the use of plastic bags and the NPBD campaign. Statistical analysis revealed a significant association between consumers' attitude and behaviour scores, as well as between gender and attitudes, and between gender and educational level with behaviours (p<0.05). Findings indicated a generally positive outcome to the implementation of the NPBD campaign; however, further research, such as longitudinal or intervention-based studies, is recommended to evaluate long-term behavioural changes and the sustained impact of the campaign. In terms of implementation, data indicate that sociodemographic factors should be considered when designing interventions to enhance the reach and impact of sustainable practices in Selangor.

[1*] Corresponding author. *E-mail address*: norashikinshaifuddin@uitm.edu.my

1. INTRODUCTION

Plastic bags are widely used for carrying purchased products (Asmuni et al., 2015) and have become synonymous with the Malaysian lifestyle (Lah & Chamhuri, 2021). They are favoured by retailers and consumers because they are inexpensive, versatile, light, durable to carry purchased items, and clean when used for the first time (Jalil et al., 2013; Asmuni et al., 2015; Lah & Chamhuri, 2021; Milbreta et al., 2025). However, most of these plastic bags are discarded after a single use (Martinho et al., 2017; MESTECC, 2018) and this contributes to the accumulation of plastic waste. In fact, only nine percent of the nine billion tonnes of plastic the world has ever produced is recycled (MESTECC, 2018), while an estimated five trillion plastic bags are used worldwide each year (Rahman, 2023). Most of these plastic bags end up in landfills, dumps in the open environment or burned (MESTECC, 2018; Chen et al., 2021a; Rahman, 2023).

Improper management of plastic waste can pose a visual nuisance to humans (Asmuni et al., 2015; Smith, 2025). Littered plastic bags can be blown by the wind over long distances, leading to their accumulation in public spaces like roads, recreational areas, and beaches. This not only affects aesthetics but also reduces property values, affects tourism, and contributes to marine litter, as well as clogging storm drains (Asmuni et al., 2015; Martinho et al., 2017; Kibria et al., 2023). Plastic bags also pose a threat to aquatic life; animals often mistake them for food, which can damage digestive systems and cause death (Asmuni et al., 2015; Andrades et al., 2021; Chen et al., 2021b; Lah & Chamhuri, 2021; Islam, 2025). For instance, sea turtles have been reported to ingest plastic bags because they resemble jellyfish, a significant part of their diet (Lah & Chamhuri, 2021; Islam, 2025). Moreover, plastic cannot be eliminated from the environment. It will take hundreds to thousands of years to break down (Asmuni et al., 2015; Kibria et al., 2023; Chamas et al., 2020; Islam, 2025), and even if aided by the weathering processes, degraded plastics are converted into secondary microplastics; one of the major global environmental issues often discussed internationally. Microplastics pollution causes severe harm to biodiversity, especially aquatic organisms (Jakubowska et al., 2020; Pannetier et al., 2020; Islam, 2025; Yang et al., 2025), with recent studies suggesting that this type of pollutant also poses a threat to human health (Bhutto et al., 2023; Zhu et al., 2024).

In an effort to address these concerns, various countries and local governments have implemented measures to reduce the use of plastic bags. This includes implementing various taxes and fees on the use of plastic bags, as well as complete bans on their use. Countries such as Portugal (Martinho et al., 2017), Turkey (Senturk & Dumludag, 2021), Wales (Poortinga et al., 2013), and Malaysia (Zen et al., 2013) have introduced taxes on plastic bags, while Kenya (Behuria, 2021), Nepal (Bharadwaj et al., 2023), and Australia (Sharp et al., 2010) have implemented bans on them. Additionally, some countries have adopted a combination of approaches, such as banning the use of plastic bags below a specific micron threshold while imposing taxes on others (Rivers et al., 2017). The United Nations Environmental Program (UNEP) has also advocated for the promotion of environmentally friendly practices through social awareness campaigns, the strengthening of recycling infrastructure, and the enhancement of waste management systems as potential approaches to address the issue (UNEP, 2018).

Malaysia is among the countries struggling with plastic waste. It generates an estimated 0.94 million tons of mismanaged plastic waste daily, of which 0.14 to 0.37 million tons are discharged into the ocean (MESTECC, 2018; Choong et al., 2021). To mitigate this, Selangor introduced the 'No Plastic Bag Day' (NPBD) campaign in 2011. Initially, plastic bags were charged RM0.20–RM0.50 on Saturdays, but since 2017, charges have been applied daily (Lah & Chamhuri, 2021). Several studies have assessed public participation in plastic bag reduction initiatives in Malaysia. Zen et al. (2013) found that early campaigns were ineffective as consumers continued to forget to bring their own shopping bags. Asmuni et al. (2015) observed only moderate participation in urban areas, with many consumers preferring to pay the levy rather than change behaviour. More recently, Lah and Chamhuri (2021) reported that bringing own's shopping bags was still not habitual, with more than half of respondents routinely forgetting. Abdullah et al. (2023) found similar results among university students. These findings reveal a persistent gap between awareness

of environmental initiatives and actual behaviour. While attitudes may be supportive, behavioural change remains inconsistent, particularly in Selangor, where the NPBD campaign has been in place for over a decade. This is a crucial problem, as the success of the initiative depends, to a large extent, on changing individual attitudes and behaviours to ensure a reduction in plastic bag consumption.

To explain this gap, theoretical frameworks such as the Model of Pro-Environmental Behaviour (Kollmuss & Agyeman, 2002) have been applied. The model highlights how demographic, external, and internal factors influence pro-environmental actions. It is particularly relevant in the Malaysian context, where external measures such as levies coexist with internal barriers such as habit and convenience (Lah & Chamhuri, 2021). However, few studies in Malaysia have explicitly applied this model to examine both attitudes and behaviours, or to test how sociodemographic factors interact with these dimensions.

Despite more than a decade of implementation, little is known about how the NPBD campaign has shaped consumer attitudes and behaviours in Selangor, and which sociodemographic factors most strongly influence these outcomes. Previous studies have largely focused on participation rates or the effectiveness of the levy, but there has been a lack of critical assessment of the underlying behavioural mechanisms using a theoretical framework. Therefore, this study applies the Model of Pro-Environmental Behaviour to evaluate consumer attitudes and behaviours towards the NPBD campaign in Selangor. The objective of this study is to assess consumer attitudes and behaviours, examine their association, and determine the influence of sociodemographic factors. By doing so, the study contributes evidence on how future interventions can be tailored to strengthen sustainable practices among consumers in Malaysia.

2. METHODOLOGY

2.1 Study Design and Data Collection

This cross-sectional study was conducted among consumers in Selangor. Selangor was chosen for this study due to the recent launch of the state's policy on the NPBD campaign, which was implemented throughout the week (Lah & Chamhuri, 2021). The survey was created using Google Forms, and a URL link was distributed to online social media platforms such as WhatsApp and Facebook within the Selangor community. The online survey enables researchers to maintain data quality and reduce instances of duplication or missing responses (Lah & Chamhuri, 2021). The sample size was determined using the Raosoft online sample size calculator, as employed in previous research (Shaifuddin et al., 2022). With a margin of error of 5%, a confidence level of 95%, a response distribution of 50%, and a population size exceeding 20,000, the necessary sample size was determined to be 377 respondents. This study successfully recruited 389 participants through a snowball sampling method, which is a convenient and cost-effective approach for reaching participants who may be unknown or inaccessible, following the same strategy as Lah & Chamhuri (2021) and Porusia et al. (2023), whereby initial participants were encouraged to share the survey link to recruit future participants.

While participants are only allowed to answer if they are at least 18 years old with no maximum age, another inclusion criterion set in this study is that individuals who participated in this study must have resided in Selangor for a minimum of six months. Additionally, the study received approval from the Ethics Research Committee of UiTM under reference number REC/07/2022 (ST/MR/129). Participants were provided with all the necessary information regarding the study before they started, and informed consent was sought at the outset of the electronic questionnaire. Participants were assured that their involvement was entirely voluntary, and they retained the option to decline participation or withdraw at any point. Moreover, participants' identities are kept confidential.

2.2 Questionnaire and Data Analysis

The structured questionnaire used in this study was adapted from previous peer-reviewed studies on plastic bag levies and the NPBD campaign, which successfully applied these instruments to assess attitudes and behaviours related to plastic usage (Poortinga et al., 2013; Arı & Yılmaz, 2017; Martinho et al., 2017; Lah & Chamhuri, 2021). While these instruments had been validated in related contexts, they were further adapted for this study through expert review, translation, and pilot testing to ensure suitability for the Malaysian context. Four academic experts in environmental health and sustainability were involved in the review process. The questionnaire was prepared in both Malay and English versions; items were first drafted in English and subsequently translated into Malay.

The final questionnaire comprised three sections. The first section gathered demographic information. The second and third sections assessed participants' attitudes and behaviours towards plastic bag use and the NPBD campaign. In total, 29 items were included (18 for attitudes and 11 for behaviours). Responses were coded dichotomously: affirmative responses were assigned one point, while negative or neutral responses received zero points. The item on participants' opinions regarding the NPBD campaign in the attitude section was excluded from scoring, as it was intended to capture a general perception rather than to measure the attitudinal construct. Similarly, Questions 1 and 2 in the behaviour section were excluded from scoring, as no reliable score could be derived from these items (Martinho et al., 2017). Raw scores were summed and converted into percentages (0–100%), representing the proportion of positive responses. Scores below 50% indicated negative attitudes or behaviours, whereas scores of 50% or higher reflected positive ones. This binary scoring system, although less granular than Likert-scale analysis, has been applied in similar studies (Saddik et al., 2021; Turner et al., 2023) and was selected for its clarity and ease of interpretation.

A pilot study was conducted among 30 consumers in Selangor to test the suitability of the questionnaire. The internal consistency (Cronbach's alpha) for the attitudes and behaviours sections was 0.842 and 0.740, respectively, indicating acceptable reliability (Tavakol & Dennick, 2011). Data from the pilot were excluded from the final analysis. Descriptive statistics (means, standard deviations, frequencies, and percentages) were calculated as appropriate. Pearson correlation analysis was used to examine the relationship between attitudes and behaviours, while logistic regression assessed the association between demographic characteristics and outcome scores. Statistical analyses were performed using IBM SPSS version 28, with significance set at $p < 0.05$.

3. RESULTS

3.1 Demographic Characteristics of Study Participants

Table 1 summarises the demographic characteristics of the study participants (n = 389). The majority of participants were aged between 18 and 25 years (53.2%), with 67.9% being female and 57.3% identifying as single. In terms of education, 67.6% had attained a tertiary education level, while 61.7% reported a monthly income of less than RM2,500. Additionally, most participants (75.8%) lived in households with four or more members.

Table 1. Demographic characteristics of study participants and their attitude-behaviour scores (n=389)

Demographic characteristics		Attitude, n (%)		Behaviour, n (%)	
		Positive	Negative	Positive	Negative
Gender	Male	95 (76.0)	30 (24.0)	65 (52.0)	60 (48.0)
	Female	241 (91.3)	23 (8.7)	182 (68.9)	82 (31.1)
Age group (years)	18 – 25	170 (82.1)	37 (17.9)	139 (67.1)	68 (32.9)
	26 – 35	67 (90.5)	7 (9.5)	48 (64.9)	26 (35.1)

	36 – 45	52 (91.2)	5 (8.8)	36 (63.2)	21 (36.8)
	46 – 55	40 (93.0)	3 (7.0)	22 (51.2)	21 (48.8)
	≥ 56	7 (87.5)	1 (12.5)	2 (25.0)	6 (75.0)
Marital status	Single	183 (82.1)	40 (17.9)	147 (65.9)	76 (34.1)
	Married	146 (92.4)	12 (7.6)	96 (60.8)	62 (39.2)
	Divorced	7 (87.5)	1 (12.5)	4 (50.0)	4 (50.0)
Household member	≤ 3 persons	77 (81.9)	17 (18.1)	53 (56.4)	41 (43.6)
	≥ 4 persons	259 (87.8)	36 (12.2)	194 (65.8)	101 (34.2)
Educational level	Secondary education	24 (85.7)	4 (14.3)	11 (39.3)	17 (60.7)
	Higher secondary/Pre-university qualifications	84 (85.7)	14 (14.3)	61 (62.2)	37 (37.8)
	Tertiary education	228 (86.7)	35 (13.3)	175 (66.5)	88 (33.5)
Monthly income	≤ RM2,500	208 (86.7)	32 (13.3)	163 (67.9)	77 (32.1)
	> RM 2,500	128 (85.9)	21 (14.1)	84 (56.4)	65 (43.6)

Individuals aged 46 to 55 demonstrated the most positive attitudes (93.0%) compared to other age groups. However, individuals aged 18 to 25 exhibited the most positive behaviours (67.1%) towards reducing plastic bag usage and supporting the NPBD campaign, as presented in Table 1. In terms of gender differences, females showed significantly more positive attitudes (91.3%) and behaviours (68.9%) than males, who reported positive attitudes of 76.0% and positive behaviours of 52.0%. This indicates that female participants were more likely to actively engage in the NPBD campaign and reduce plastic bag usage. Marital status also influenced attitudes and behaviours. Married individuals exhibited more positive attitudes (92.4%), whereas single individuals displayed more positive behaviours (65.9%). Household size appeared to play a role as well, with participants from households of more than three members showing positive attitudes (87.8%) and behaviours (65.8%). Educational attainment further highlighted differences, with individuals holding tertiary-level qualifications demonstrating positive attitudes (86.7%) and behaviours (66.5%) towards the campaign. Similarly, income level was a contributing factor, as participants earning RM2500 or less per month reported more positive attitudes (86.7%) and behaviours (67.9%) compared to those earning above RM2500. Figure 1 presents an overview of the source information for the 'No Plastic Bag Day' campaign as indicated by participants. The study revealed that supermarkets/hypermarkets are a significant and reliable source of information for the NPBD campaign (54%), followed by media (28.2%), and family and friends (11.1%).

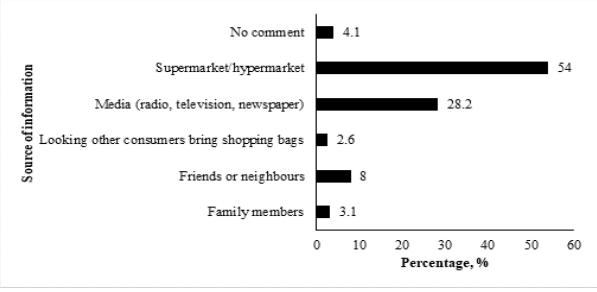

Fig. 1. Source information of the NPBD campaign

3.2 Consumers' Attitudes and Behaviours on the Use of Plastic Bags and NPBD Campaign in Selangor

Table 2 summarises the scores and provides further insight into consumers' attitudes towards the use of plastic bags and the NPBD campaign in Selangor. The total mean score for consumers' attitudes was 73% ± 19%, indicating a generally positive attitude towards the use of plastic bags and the NPBD campaign.

Most participants (83.0%) perceived their plastic bag usage as sufficient, small, or very small, while 17.0% considered it excessive or very excessive. Regarding opinions on whether lightweight bags are less harmful to the environment, participants considered biodegradable plastic bags or bags made of other materials as less harmful (41.7%). Over 80.0% of participants concurred that plastic bags have harmful effects on the environment and living organisms. When asked if they would be more inclined to use eco-friendly bags if their neighbours did so instead of using plastic, the majority agreed (60.9%). Similarly, a significant proportion (70.4%) expressed their likelihood of using eco-friendly bags if their significant others opted for them. In this context, significant other refers to spouse or partners. Concerning the perspective on whether grocers should be prohibited from selling fruit and vegetables packaged in plastic bags, 43.2% agreed. However, opinions were more divided when queried about whether the government should impose a ban on plastic usage, with only 34.4% in agreement, while the rest remained neutral or disagreed.

Table 2. Consumers' attitudes on the use of plastic bags and the NPBD campaign in Selangor (n=389)

Question	Response	Scoring (Positive = 1, Negative / Neutral = 0)	Frequency (n)	Percentage (%)
1. In your opinion, the number of plastic bags you use is	Too excessive / Excessive	1	66	17.0
	Sufficient / Small / Very small	0	323	83.0
2. Which grocery bags do you consider less harmful to the environment?	Biodegradable / Other materials	1	211	54.2
	Disposable / Reusable / Recycled	0	178	45.8
3. Plastic bags are harmful to the environment and living organism (animals, human).	Agree / Strongly agree	1	330	84.8
	Neutral / Disagree / Strongly disagree	0	59	15.2
4. If my neighbours use eco-friendly bag instead of plastic, I would more likely use eco-friendly bags.	Agree / Strongly agree	1	237	60.9
	Neutral / Disagree / Strongly disagree	0	152	39.1
5. If significant others use eco-friendly bag instead of plastic, I would more likely use eco-friendly bags.	Agree / Strongly agree	1	274	70.4
	Neutral / Disagree / Strongly disagree	0	115	29.6
6. Grocers should be prohibited from selling fruit and vegetables packaged in plastic bags to their customers.	Agree / Strongly agree	1	168	43.2
	Neutral / Disagree / Strongly disagree	0	221	56.8
7. The government should ban the use of plastic bags.	Agree / Strongly agree	1	134	34.4
	Neutral / Disagree / Strongly disagree	0	255	65.6
8. I prefer to use eco-friendly bags instead of plastic.	Agree / Strongly agree	1	264	67.9
	Neutral / Disagree / Strongly disagree	0	125	32.1
9. I will use fewer plastic bags in the near future.	Agree / Strongly agree	1	285	73.3
	Neutral / Disagree / Strongly disagree	0	104	26.7
10. If supermarkets offered discounts to shoppers who bring their own shopping bags, I would use fewer plastic bags.	Agree / Strongly agree	1	307	78.9
	Neutral / Disagree / Strongly disagree	0	82	21.1
11. I am aware of the NPBD campaign in Malaysia.	Yes	1	362	93.1
	No	0	27	6.9
12. I feel that the 'No Plastic Bag Day' campaign in Malaysia is effective.	Agree / Strongly agree	1	178	45.8
	Neutral / Disagree / Strongly disagree	0	211	54.2
13. I support the 'No Plastic Bag Day' campaign by reducing the use of plastic bags.	Agree / Strongly agree	1	319	82.0
	Neutral / Disagree / Strongly disagree	0	70	18.0
	Agree / Strongly agree	1	318	81.7

14.	I believe that the 'No Plastic Bag Day' campaign can reduce environmental pollution.	Neutral / Disagree / Strongly disagree	0	71	18.3
15.	The community should always be reminded to bring their own shopping bags.	Agree / Strongly agree	1	331	85.1
		Neutral / Disagree / Strongly disagree	0	58	14.9
16.	Merchants should advertise "plastic-free" reminders to remind consumers.	Agree / Strongly agree	1	333	85.6
		Neutral / Disagree / Strongly disagree	0	56	14.4
17.	Plastic bag recycling initiatives need to be expanded.	Agree / Strongly agree	1	347	89.2
		Neutral / Disagree / Strongly disagree	0	42	10.8
Total Attitude Score[a]			73% ± 19%		

Note: [a]Values are expressed as Mean ± Standard Deviation

The majority of participants express a preference for using eco-friendly bags over plastics (67.9%), and a significant majority indicate their intention to use fewer plastic bags in the near future (73.3%). Furthermore, the majority agree that they would reduce their plastic bag usage if supermarkets offered discounts to shoppers who bring their own bags (78.9%). A large majority of participants are aware of the NPBD campaign in Malaysia (93.1%), with only a minority (6.9%) indicating otherwise. Regarding perceptions of the effectiveness of the NPBD campaign in Malaysia, 45.8% of participants feel that it is effective, while the rest remained neutral or disagreed. Additionally, a substantial majority agreed that they support the NPBD campaign by reducing their use of plastic bags (82.0%). Most participants believe that the NPBD campaign can effectively reduce environmental pollution (81.7%) and agree that the community should always be reminded to bring their own shopping bags (85.1%). Furthermore, the majority of participants agree that merchants should advertise "plastic-free" reminders to encourage consumers (85.6%), and they also support the expansion of plastic bag recycling initiatives (89.2%). When participants were asked for their opinions regarding the NPBD campaign, the majority expressed support for it as a positive initiative that should be sustained (63.5%), as shown in Figure 2.

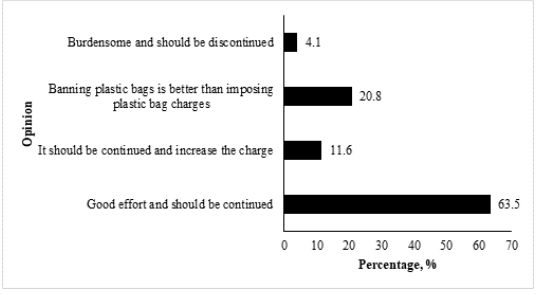

Fig. 2. Participants' opinion regarding the NPBD campaign

Table 3 summarises the scores and provides more insight into consumers' behaviours on the use of plastic bags and the NPBD campaign in Selangor. The total mean score for consumers' behaviour was 53% ± 17%, indicating a generally positive behaviour towards the use of plastic bags and the NPBD campaign. Most respondents reported shopping 2-3 times per week (29.0%), once per week (28.3%), or 2-3 times per month (27.5%), with the majority (84.8%) travelling by car. In terms of shopping bag practices, 48.6% reported frequently bringing their own bag, although 20.1% stated they never do so. During their last supermarket visit, 41.1% brought their own shopping bag exclusively, 21.3% combined own and store-provided plastic bags, 28.8% relied entirely on store-provided plastic bags (paying the levy), and 8.8% brought no bags and did not use plastic bags. For the number of plastic bags used during recent shopping trips, 19.3% reported using none, 41.1% used 1-2 bags, and 24.7% used 3-4 bags. Forgetfulness was also common, with 56.0% admitting they forgot their own bag 1-2 times out of five shopping trips, while 21.6% stated they never brought a shopping bag. When respondents forgot or lacked enough bags, 37.2% opted to

use store-provided plastic bags (and pay the levy), 28.0% purchased eco-friendly bags, and 21.1% avoided plastic by carrying groceries or using a trolley. Cashier interactions further influenced behaviour: 51.4% chose to pay for plastic bags, 19.8% brought their own bag, 14.9% declined to buy plastic bags and left without one, and 3.3% noted that no information was provided at the counter. Regarding garbage bags, 37.5% reported always purchasing them. Encouragingly, 65.0% of participants stated that their consumption behaviours had changed following the NPBD campaign. Specifically, 63.5% reported no longer purchasing plastic bags, 78.4% indicated they now bring their own bags more often, 72.5% reported better purchase planning, and 59.4% avoided plastic bags by using alternatives such as trolleys.

Table 3. Consumers' behaviours on the use of plastic bags and the NPBD campaign in Selangor (n=389)

Question	Response	Scoring (Positive = 1, Negative / Neutral = 0)	Frequency (n)	Percentage (%)
1. How often do you do shopping?	Everyday	-	19	4.9
	2 - 3 times per week	-	113	29.0
	Once per week	-	110	28.3
	2 – 3 times per month	-	107	27.5
	Once per month	-	32	8.2
	Less than once per month	-	8	2.1
2. How do you go to shopping?	By foot	-	9	2.3
	By car	-	330	84.8
	By motorcycle	-	30	7.7
	By public transport	-	16	4.1
	Others	-	4	1.1
3. How often do you bring your own shopping bag?	Frequent	1	189	48.6
	Infrequent	0	200	51.4
4. Do you bring your own shopping bags during last trip to supermarket?	Own bag only	1	160	41.1
	Plastic bag use	0	229	58.9
5. Total number of plastic grocery bag used during recent shopping trips (provided by retailers).	Low use	1	235	60.4
	High use	0	154	39.6
6. For each 5 times you shop, how many times do you forget to bring your own shopping bag?	Rarely forget	1	302	77.6
	Frequently forget	0	87	22.4
7. What do you do if you forget to bring your own bags or don't take enough bags for grocery shopping?	Eco-friendly alternatives	1	191	49.1
	Plastic reliance	0	198	50.9
8. What is your response when the cashier informs you that 'no plastic bags are provided'/ 'you have to pay for the bags'?	Pro-environmental response	1	176	45.2
	Pays levy / Not applicable	0	213	54.8
9. Do you buy garbage bags?	Minimal purchase	1	135	34.7
	Regular purchase	0	254	65.3
10. Has your consumption behaviour toward plastic bags changed after the launch of the ' No Plastic Bag Day' campaign?	Yes	1	253	65.0
	No / I don't know	0	136	35.0
11. The 'No Plastic Bag Day' campaign has changed the way I shop:				
a) It doesn't change anything. I'm still buying plastic bag(s).	Agree	0	142	36.5
	Disagree	1	247	63.5
b) I bring my own shopping bags more often.	Agree	1	305	78.4
	Disagree	0	84	21.6
c) I plan the purchase amount.	Agree	1	282	72.5
	Disagree	0	107	27.5
d) I didn't bring a bag but didn't buy a plastic bag either (use trolley etc).	Agree	1	231	59.4
	Disagree	0	158	40.6
Total Behaviour Score[a]		53% + 17%		

Note: [a]Values are expressed as Mean ± Standard Deviation

3.3 Factors Associated with the Use of Plastic Bags and the NPBD Campaign in Selangor

As shown in Table 4, binary logistic regression was performed to investigate the effects of gender, age, marital status, household size, educational level, and average monthly income on the likelihood that have positive attitudes and behaviours toward the use of plastic bags and the NPBD campaign. The logistic regression was statistically significant, $\chi^2(7) = 33.960$, $p<0.001$, explaining 15.2% (Nagelkerke, $R^2 = 0.152$) of the variance in attitudes. Gender was a significant predictor of consumer attitudes, Wald $\chi^2(1) = 15.84$, $p < 0.001$. Specifically, male respondents had 72% lower odds of exhibiting positive attitudes toward the NPBD campaign compared to female respondents, OR = 0.28, 95% CI [0.15, 0.52]. No other sociodemographic variables reached statistical significance. However, there were non-significant trends suggesting that older age (OR = 1.56, 95% CI [0.89, 2.72]) and larger household size (OR = 1.58, 95% CI [0.79, 3.19]) may be associated with greater odds of positive attitudes. Higher educational levels also showed a non-significant association with increased odds of positive attitudes (OR = 1.27, 95% CI [0.75, 2.13]). On the other hand, participants with higher monthly incomes were non-significantly associated with lower odds of positive attitudes (OR = 0.44, 95% CI [0.18, 1.05]).

The model predicting behaviours was also statistically significant, χ^2 (7) = 22.04, $p < 0.001$, but explained a smaller proportion of variance (Nagelkerke, $R^2 = 0.075$). Gender was a significant predictor, Wald $\chi^2(1) = 5.40$, $p < 0.020$, with male respondents showing 42% lower odds of positive behaviours compared to female respondents, OR = 0.58, 95% CI [0.37, 0.92]. Educational level was also significant, Wald $\chi^2(1) = 4.32$, $p < 0.038$; respondents with higher education have 46% higher odds of reporting positive behaviours (OR = 1.46, 95% CI [1.02, 2.07]), compared to those with lower education. No other sociodemographic variables reached significant. However, marital status (OR = 1.62, 95% CI [0.82, 3.20]) and larger household size (OR = 1.45, 95% CI [0.88, 2.40]) suggested positive, non-significant associations. Although not statistically, age (OR = 0.79, 95% CI [0.57, 1.10]) and higher monthly incomes (OR = 0.76, 95% CI [0.43, 1.34]) were associated with lower odds of positive behaviours. These results indicate that gender and education level are significant predictors of positive consumers' attitudes and behaviours toward the NPBD campaign, with other sociodemographic factors showing varying degrees of non-significant influence.

Table 4. Logistic regression analysis of sociodemographic factors associated with consumers' attitude and behaviour (n=389)

Variables	Attitude					Behaviour				
	B	SE	Exp (B)	95% CI	*p*-value	B	SE	Exp (B)	95% CI	*p*-value
Gender	-1.281	0.322	0.278	0.148-0.522	<0.001*	-0.547	0.235	0.579	0.365-0.918	0.020*
Age	0.442	0.285	1.556	0.891-2.719	0.120	-0.238	0.168	0.788	0.567-1.096	0.157
Marital status	0.899	0.551	2.456	0.834-7.233	0.103	0.480	0.348	1.615	0.816-3.197	0.168
Household member	0.459	0.358	1.583	0.785-3.192	0.200	0.374	0.255	1.454	0.882-2.397	0.142
Educational level	0.237	0.265	1.267	0.754-2.128	0.371	0.375	0.181	1.455	1.021-2.073	0.038*
Monthly income	-0.832	0.448	0.435	0.181-1.047	0.063	-0.279	0.292	0.756	0.427-1.341	0.340

Summary statistics
Model χ^2 for attitude = 33.960, $p<0.001$; $R^2 = 0.152$
Model χ^2 for behaviour = 22.044, $p<0.001$; $R^2 = 0.075$

* *p-value is significant at 0.05.*

Table 5 presents an overview of the correlation between consumers' attitudes and behaviours towards the use of plastic bags and the NPBD campaign in Selangor. A significant positive correlation was found between consumers' attitudes and behaviours, $r(389) = 0.95$, $p < 0.001$. This indicates that consumers'

attitudes significantly influence their behaviours regarding the use of plastic bags and the NPBD campaign in Selangor.

Table 5. Correlation of consumers' attitudes and behaviours

Level	Pearson Correlation	Sig.
Attitude – Behaviour	0.952**	<0.001

** *Correlation is significant at the 0.01 level (2-tailed).*

4. DISCUSSION

This study examined consumers' attitudes and behaviours towards plastic bag use and the NPBD campaign in Selangor, as well as the influence of demographic characteristics. Overall, consumers demonstrated positive attitudes and behaviours, consistent with findings from Portugal, Wales, Taiwan, Indonesia, and Malaysia (Martinho et al., 2017; Poortinga et al., 2013; Chang & Chou, 2018; Angriani et al., 2021; Asmuni et al., 2015; Lah & Chamhuri, 2021). Respondents generally perceived themselves as reducing plastic bag use and increasingly purchasing garbage bags, echoing prior studies where plastic bag charges shifted consumption patterns (Martinho et al., 2017; Senturk & Dumludag, 2021). The NPBD campaign also encouraged adoption of reusable bags, reflecting broader trends in sustainable consumer behaviour (Sharp et al., 2010; Madigele et al., 2017; Arı & Yılmaz, 2017). More than half of the participants planned to reduce plastic bag use further, and several supermarkets in Selangor have already replaced single-use bags with reusable or paper alternatives, supporting this shift. Importantly, respondents viewed the NPBD campaign as effective and supported its continuation. While financial incentives such as discounts were suggested, prior research shows such measures may only prompt short-term changes (Thøgersen, 2003; Jakovcevic et al., 2014; Dikgang & Visser, 2012). Instead, the charge itself can act as a behavioural "nudge," encouraging consumers to reflect on environmentally responsible choices (Poortinga et al., 2013; Martinho et al., 2017).

External drivers also played a role. Participants endorsed strategies such as merchant-led reminders, recycling initiatives, and restrictions on plastic packaging for fresh produce, similar to findings in Turkey (Arı & Yılmaz, 2017). While concerns about spoilage may limit full implementation, reducing unnecessary packaging empowers consumers to make more sustainable choices and may help curb food waste (Beitzen-Heineke et al., 2017; Mielinger & Weinrich, 2023). Demographic factors further influenced responses. Female respondents showed more positive attitudes and behaviours, likely reflecting their greater involvement in household shopping, as reported in earlier studies (Sharp et al., 2010; Senturk & Dumludag, 2021). Respondents with tertiary education also demonstrated stronger pro-environmental behaviours, consistent with research linking education to environmental concern (Rezai et al., 2015). These findings suggest that behavioural change efforts may need to focus more on men and individuals with lower education levels, while integrating environmental education early in the school curriculum.

The findings also indicate that consumers' behaviours can be positively shaped by their attitudes towards the NPBD campaign, potentially reinforcing sustainable practices (Kallgren & Wood, 1986; Guagnano et al., 1995; Meinhold & Malkus, 2005; Ertz et al., 2016; Chang & Chou, 2018; Jakučionytė-Skodienė et al., 2020; Zhou et al., 2024). Awareness-raising strategies such as motivational posters, readily available recycled bags, or verbal reminders from merchants may further encourage behaviour change (Sedtha et al., 2022). Given that store advertising was reported as the main information source, retailer-based communication appears effective, though leveraging social media platforms such as TikTok, Twitter, YouTube, Facebook, and Instagram could expand outreach, particularly among younger consumers (Bozzola et al., 2022).

This study has several limitations that should be acknowledged. The strong correlation between attitudes and behaviours indicates that attitudes are a key driver of behavioural outcomes. Although the high value may partly reflect conceptual overlap from binary scoring or item design, it nonetheless underscores the close interrelationship between attitudes and behaviours in the context of plastic bag reduction. While factor analysis was not conducted, future research could examine this overlap more rigorously to refine construct measurement. The use of self-reported data carries the possibility of information bias, though the non-sensitive nature of the questions likely minimised this risk. Similarly, snowball sampling through social media may have introduced some selection bias, yet it enabled broad coverage across diverse respondents in Selangor, which strengthens the value of the findings. Finally, although binary scoring may have limited response variability, it provided a consistent and practical means of capturing attitudes and behaviours. These limitations should be considered when interpreting the findings, but they do not detract from the overall significance of the results.

5. CONCLUSION

This study highlights generally positive consumer attitudes and behaviours towards reducing plastic bag use and supporting the NPBD campaign in Selangor, reflecting the campaign's effectiveness and broad public acceptance. The findings further suggest that demographic factors, such as gender and educational level, play a role in shaping these outcomes, with positive behaviours being driven by positive attitudes. However, it is important to note that the levels of attitudes and behaviours vary across different demographic characteristics among consumers in the state. Importantly, the results represent a snapshot in time; further in-depth research, including longitudinal or intervention-based studies, is needed to better understand underlying motivations and the long-term impact of NPBD on environmental awareness and behaviour. Despite its limitations, this study provides meaningful insights to inform more targeted, inclusive, and sustainable strategies for environmental protection initiatives in Selangor.

6. ACKNOWLEDGEMENTS/FUNDING

The authors would like to acknowledge the Universiti Teknologi MARA for funding this research under the Geran Penyelidikan MyRA (600-RMC/GPM SS 5/3 (088/2021)).

7. CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

8. AUTHORS' CONTRIBUTIONS

Shantakumari Rajan: Conceptualisation, methodology, data analysis and validation, and writing-original draft; **Nor Farrahanim Mohd Nasir**: Investigation, data analysis and validation; **Siti Norashikin Mohamad Shaifuddin**: Conceptualisation, methodology, data analysis and validation, writing-original draft and review; **Alia Azmi**: Conceptualisation, methodology, data analysis and validation, writing-review and editing; **Mohd Izwan Masngut**: Conceptualisation, methodology, writing-review and editing; **Nadiatul Syima Mohd Shahid**: Methodology, writing-review and editing; **Nur Rohmah Suwandi**: Methodology, writing-review and editing.

9. REFERENCES

Abdullah, E. N., Rahman, H. A., & Zain, I. N. M. (2023). Knowledge and practice on the no plastic bag campaign among undergraduate students in Universiti Putra Malaysia (UPM). *Malaysian Journal of Medicine & Health Sciences*, *19*(Supp10), 98-108. http://psasir.upm.edu.my/id/eprint/110227/1/110227.pdf.

Andrades, R., Trindade, P. A. A., & Giarrizzo, T. (2021). A novel facet of the impact of plastic pollution on fish: Silver croaker (Plagioscion squamosissimus) suffocated by a plastic bag in the Amazon estuary, Brazil. *Marine Pollution Bulletin*, *166*, 112197. https://doi.org/10.1016/j.marpolbul.2021.112197.

Angriani, P., Muhaimin, M., Hastuti, K. P., Adyatma, S., & Saputra, A. N. (2021). Ban on plastic bags usage: Consumer perception of single-use plastic bags in traditional market. *Advances in Social Science, Education and Humanities Research*, *252*, 226-232. https://doi.org/10.2991/assehr.k.210222.036.

Arı, E., & Yılmaz, V. (2017). Consumer attitudes on the use of plastic and cloth bags. *Environment, Development and Sustainability*, *19*(4), 1219-1234. https://doi.org/10.1007/s10668-016-9791-x.

Asmuni, S., Hussin, N. B., Khalili, J. M., & Zain, Z. M. (2015). Public participation and effectiveness of the no plastic bag day program in Malaysia. *Procedia-Social and Behavioral Sciences*, *168*, 328-340. https://doi.org/10.1016/j.sbspro.2014.10.238.

Behuria, P. (2021). Ban the (plastic) bag? Explaining variation in the implementation of plastic bag bans in Rwanda, Kenya and Uganda. *Environment and Planning C: Politics and Space*, *39*(8), 1791-1808. https://doi.org/10.1177/2399654421994836.

Beitzen-Heineke, E. F., Balta-Ozkan, N., & Reefke, H. (2017). The prospects of zero-packaging grocery stores to improve the social and environmental impacts of the food supply chain. *Journal of Cleaner Production*, *140*, 1528-1541. https://doi.org/10.1016/j.jclepro.2016.09.227.

Bharadwaj, B., Subedi, M. N., & Rai, R. K. (2023). Retailer's characteristics and compliance with the single-use plastic bag ban. *Sustainability Analytics and Modeling*, *3*, 100019. https://doi.org/10.1016/j.samod.2023.100019.

Bhutto, S. U. A., Ma, Y. F., Akram, M., & You, X. Y. (2023). Microplastics in Tai lake food web: Trophic transfer and human health risk assessment. *Environmental Toxicology and Pharmacology*, *101*, 104206. https//doi.org/10.1016/j.etap.2023.104206.

Bozzola, E., Spina, G., Agostiniani, R., Barni, S., Russo, R., Scarpato, E., Di Mauro, A., Di Stefano, A.V., Caruso, C., Corsello, G., & Staiano, A. (2022). The use of social media in children and adolescents: Scoping review on the potential risks. *International Journal of Environmental Research and Public Health*, *19*(16), 9960. https://doi.org/10.3390/ijerph19169960.

Chamas, A., Moon, H., Zheng, J., Qiu, Y., Tabassum, T., Jang, J. H., Abu-Omar, M., Scott, S. L., & Suh, S. (2020). Degradation rates of plastics in the environment. *ACS Sustainable Chemistry & Engineering*, *8*(9), 3494-3511. https://doi.org/10.1021/acssuschemeng.9b06635.

Chang, S. H., & Chou, C. H. (2018). Consumer intention toward bringing your own shopping bags in Taiwan: An application of ethics perspective and theory of planned behavior. *Sustainability*, *10*(6), 1815. https://doi.org/10.3390/su10061815.

Chen, H. L., Nath, T. K., Chong, S., Foo, V., Gibbins, C., & Lechner, A. M. (2021a). The plastic waste problem in Malaysia: management, recycling and disposal of local and global plastic waste. *SN Applied Sciences*, *3*, 437. https://doi.org/10.1007/s42452-021-04234-y.

Chen, Y., Awasthi, A. K., Wei, F., Tan, Q., & Li, J. (2021b). Single-use plastics: Production, usage, disposal, and adverse impacts. *Science of the Total Environment*, *752*, 141772. https://doi.org/10.1016/j.scitotenv.2020.141772.

Choong, W. S., Hadibarata, T., & Tang, D. K. H. (2021). Abundance and distribution of microplastics in the water and riverbank sediment in Malaysia—A review. *Biointerface Research in Applied Chemistry*, *11*(4), 11700-11712. https://doi.org/10.33263/briac114.1170011712.

Dikgang, J., & Visser, M. (2012). Behavioural response to plastic bag legislation in Botswana. *South African Journal of Economics*, *80*(1), 123-133. https://doi.org/10.1111/j.1813-6982.2011.01289.x.

Ertz, M., Karakas, F., & Sarigöllü, E. (2016). Exploring pro-environmental behaviors of consumers: An analysis of contextual factors, attitude, and behaviors. *Journal of Business Research*, *69*(10), 3971-3980. https://doi.org/10.1016/j.jbusres.2016.06.010.

Guagnano, G. A., Stern, P. C., & Dietz, T. (1995). Influences on attitude-behavior relationships: A natural experiment with curbside recycling. *Environment and Behavior*, *27*(5), 699-718. https://doi.org/10.1177/0013916595275005.

Islam, F. A. S. (2025). The effects of plastic and microplastic waste on the marine environment and the ocean. *European Journal of Environment and Earth Sciences*, *6*(3), 1-9. https://doi.org/10.24018/ejgeo.2025.6.3.508.

Jakovcevic, A., Steg, L., Mazzeo, N., Caballero, R., Franco, P., Putrino, N., & Favara, J. (2014). Charges for plastic bags: Motivational and behavioral effects. *Journal of Environmental Psychology*, *40*, 372-380. https://doi.org/10.1016/j.jenvp.2014.09.004.

Jalil, M. A., Mian, M. N., & Rahman, M. K. (2013). Using plastic bags and its damaging impact on environment and agriculture: An alternative proposal. *International Journal of Learning & Development*, *3*(4), 1-14. https:// doi.org/10.5296/ijld.v3i4.4137.

Jakubowska, M., Białowąs, M., Stankevičiūtė, M., Chomiczewska, A., Pažusienė, J., Jonko-Sobuś, K., Hallmann, A., & Urban-Malinga, B. (2020). Effects of chronic exposure to microplastics of different polymer types on early life stages of sea trout Salmo trutta. *Science of the Total Environment*, *740*, 139922. https://doi.org./10.1016/j.scitotenv.2020.139922.

Jakučionytė-Skodienė, M., Dagiliūtė, R., & Liobikienė, G. (2020). Do general pro-environmental behaviour, attitude, and knowledge contribute to energy savings and climate change mitigation in the residential sector?. *Energy*, *193*, 116784. https://doi.org/10.1016/j.energy.2019.116784.

Kallgren, C. A., & Wood, W. (1986). Access to attitude-relevant information in memory as a determinant of attitude-behavior consistency. *Journal of Experimental Social Psychology*, *22*(4), 328-338. https://doi.org/10.1016/0022-1031(86)90018-1.

Kibria, M. G., Masuk, N. I., Safayet, R., Nguyen, H. Q., & Mourshed, M. (2023). Plastic waste: challenges and opportunities to mitigate pollution and effective management. *International Journal of Environmental Research*, *17*(1), 20. https://doi.org/10.1007/s41742-023-00507-z.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?. *Environmental Education Research*, *8*(3), 239-260. https://doi.org/10.1080/13504620220145401.

Lah, S. C., & Chamhuri, N. (2021). Tinjauan awal gelagat pengguna Malaysia terhadap isu penggunaan beg plastik (Consumer attitudes on the use of plastic bags in Malaysia: a preliminary

study). *Akademika*, *91*(1), 25-38. https:// doi.org/10.17576/akad-2021-9101-03.

Madigele, P. K., Mogomotsi, G. E. J., & Kolobe, M. (2017). Consumer willingness to pay for plastic bags levy and willingness to accept eco-friendly alternatives in Botswana. *Chinese Journal of Population Resources and Environment*, *15*(3), 255-261. https://doi.org/10.1080/10042857.2017.1369243.

Martinho, G., Balaia, N., & Pires, A. (2017). The Portuguese plastic carrier bag tax: The effects on consumers' behavior. *Waste Management*, *61*, 3-12. https//doi.org/10.1016/j.wasman.2017.01.023.

Meinhold, J. L., & Malkus, A. J. (2005). Adolescent environmental behaviors: Can knowledge, attitudes, and self-efficacy make a difference?. *Environment and Behavior*, *37*(4), 511-532. https://doi.org/10.1177/0013916504269665.

Mielinger, E., & Weinrich, R. (2023). A review on consumer sorting behaviour: Spotlight on food and fast moving consumer goods plastic packaging. *Environmental Development*, *47*, 100890. https://doi.org/10.1016/j.envdev.2023.100890.

Milbreta, U., Milich, L., Andze, L., & Gusca, J. (2025). Some countries can say "no!" to single-use plastics, others cannot: Why do seemingly similar policies have different outcomes?. *Journal of Sustainability Research*, *7*(1), e250004. https:// doi.org/10.20900/jsr20250004.

Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC). (2018). *Malaysia's roadmap towards zero single use plastics 2018–2030*. *https://www.mpma.org.my/v4/wp-content/uploads/2021/07/malaysia-roadmap-towards-zero-single-use-plastics-2018-20302.pdf.*

Pannetier, P., Morin, B., Le Bihanic, F., Dubreil, L., Clérandeau, C., Chouvellon, F., Van Arkel, K., Danion, M., & Cachot, J. (2020). Environmental samples of microplastics induce significant toxic effects in fish larvae. *Environment International*, *134*, 105047. https://doi.org/10.1016/j.envint.2019.105047.

Poortinga, W., Whitmarsh, L., & Suffolk, C. (2013). The introduction of a single-use carrier bag charge in Wales: Attitude change and behavioural spillover effects. *Journal of Environmental Psychology*, *36*, 240-247. https://doi.org/10.1016/j.jenvp.2013.09.001.

Porusia, M., Sapavi, N. A. M., & Shaifuddin, S. N. M. (2023). Knowledge and attitudes of food safety and its associated factors among street food consumers in Kuala Kangsar, Perak, Malaysia. *Journal of Health and Translational Medicine*, 333-341. https://doi.org/10.22452/jummec.sp2023no2.37.

Rahman, H. A. (2023, August 15). Plastic, burden to the environment. *News: Institute for Social Science Studies, Universiti Putra Malaysia*. *https://ipsas.upm.edu.my/news/plastic_burden_to_the_environment-74561*.

Rezai, G., Hosseinpour, M., Shamsudin, M. N., AbdLatif, I., & Sharifuddin, J. (2015). Effects of go-green campaigns on changing attitude towards green behaviour. *Pertanika Journal of Social Science and Humanities*, *23*, 77-92. http://www.pertanika.upm.edu.my/resources/files/pertanika%20papers/jssh%20vol.%2023%20(s)%20jun.%202015/07%20jssh%201359-2015.pdf.

Rivers, N., Shenstone-Harris, S., & Young, N. (2017). Using nudges to reduce waste? The case of Toronto's plastic bag levy. *Journal of Environmental Management*, *188*, 153-162. https://doi.org/10.1016/j.jenvman.2016.12.009.

Saddik, B., Hussein, A., Albanna, A., Elbarazi, I., Al-Shujairi, A., Temsah, M. H., Saheb Sharif-Askari, M. H., F., Stip, E., Hamid, Q., & Halwani, R. (2021). The psychological impact of the COVID-19 pandemic on adults and children in the United Arab Emirates: a nationwide cross-sectional study. *BMC*

Psychiatry, *21*(1), 224. https://doi.org/10.1186/s12888-021-03213-2.

Sedtha, S., Nitivattananon, V., Ahmad, M. M., & Cruz, S. G. (2022). The first step of single-use plastics reduction in Thailand. *Sustainability*, *15*(1), 45. https://doi.org/10.3390/su15010045.

Senturk, G., & Dumludag, D. (2021). An evaluation of the effect of plastic bag fee on consumer behavior: Case of Turkey. *Waste Management*, *120*, 748-754. https://doi.org/10.1016/j.wasman.2020.10.042.

Shaifuddin, S. N. M., Azmi, A., Mohammad Ghazali, S. N. F., & Shahid, N. S. M. (2022). Food accessibility and movement control order: Analyzing impact of first lockdown on access to food. *Malaysian Journal of Medicine & Health Sciences*, *18*(8), 176-182. https://doi.org/10.47836/mjmhs18.8.24.

Sharp, A., Høj, S., & Wheeler, M. (2010). Proscription and its impact on anti-consumption behaviour and attitudes: the case of plastic bags. *Journal of Consumer Behaviour*, *9*(6), 470-484. https://doi.org/10.1002/cb.335.

Smith, S. P. (2025). "The trash is ruining the picture": social media, sustainability, and the semiotics of pristine nature. *Social Semiotics*, *35*(3), 429-449. https://doi.org/10.1080/10350330.2024.2341396.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd.

Thøgersen, J. (2003). Monetary incentives and recycling: Behavioural and psychological reactions to a performance-dependent garbage fee. *Journal of Consumer Policy*, *26*(2), 197-228. https://doi.org/10.1023/a:1023633320485.

Turner, A., LaMonica, H. M., Moroney, C., O'Leary, F., Naismith, S. L., & Flood, V. M. (2023). Knowledge, attitudes, and behaviours concerning the Mediterranean diet among older adults in Australia. *Journal of Community Health*, *48*(6), 951-962. https://doi.org/10.1007/s10900-023-01237-1.

United Nations Environmental Program (UNEP). (2018). *Single-use plastics: A roadmap for sustainability*. *https://www.unep.org/resources/report/single-use-plastics-roadmap-sustainability.*

Yang, H., Wu, F., Chen, F., Zeng, J., Yang, Q., Ma, L., Zhai, T., Zhou, Y., & Huang, W. (2025). Polystyrene microplastics affect the early life stages of large yellow croaker Pseudosciaena crocea. *Journal of Oceanology and Limnology*, *43*(2), 644-655. https://doi.org/10.1007/s00343-025-4184-3.

Zen, I. S., Ahamad, R., & Omar, W. (2013). No plastic bag campaign day in Malaysia and the policy implication. *Environment, Development and Sustainability*, *15*(5), 1259-1269. https://doi.org/10.1007/s10668-013-9437-1.

Zhou, Y., Gao, W., Kato, T., Yao, W., Shi, C., Wang, J., & Fei, F. (2024). Investigating key factors influencing consumer plastic bag use reduction in Nanjing, China: A comprehensive SEM-ANN analysis. *Process Safety and Environmental Protection*, *181*, 395-406. https://doi.org/10.1016/j.psep.2023.11.043.

Zhu, L., Kang, Y., Ma, M., Wu, Z., Zhang, L., Hu, R., Xu, Q., Zhu, J., Gu, X., & An, L. (2024). Tissue accumulation of microplastics and potential health risks in human. *Science of the Total Environment*, *915*, 170004. https://doi.org/10.1016/j.scitotenv.2024.170004.

About the Authors

Shantakumari Rajan, PhD is a senior lecturer at the Centre for Environmental Health and Safety Studies, Faculty of Health Sciences, Universiti Teknologi MARA (UiTM). She can be reached through her email at shanta@uitm.edu.my.

Nor Farrahanim Mohd Nasir is a former student of the Bachelor of Environmental Health and Safety (Hons.) programme, Faculty of Health Sciences, Universiti Teknologi MARA (UiTM). She can be reached through her email at 2019423146@student.uitm.edu.my.