

RESEARCH ARTICLE

Understanding sociodemographic factors influencing behaviour against littering in greenspace in Shah Alam, Selangor

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Abstract:

Despite its scientific relevance and importance for solid waste management and pollution control, studies on littering are incredibly underrepresented in the greenspace in Shah Alam and in most of developing countries. Urban greenspaces like national parks or woodland are subjected to various recreational impacts, including littering. The increased number of visitors to the parks has led to a rise in littering which poses pollution and being a significant environmental threat. To gain insight into people's littering habits, this study examined the relationship between sociodemographic background and littering behavior in Shah Alam, Selangor. An online cross-sectional survey was conducted to obtain information on the response of the public to littering and perception of cleaning responsibilities. Sociodemographic characteristics were found to have a significant relationship with littering. The results provided an overview of the sociodemographic effect on public littering behaviour and highlighted the possibility that an integrated litter prevention plan (social, cognitive, and technological) is the most efficient method to handle the problem of littering in Shah Alam. This study benefited by assisting the government in litter prevention and emphasizing the need to solve the litter problem in Shah Alam. This study highlighted the possibility that an integrated litter prevention plan is the most efficient method to handle the problem of littering in Shah Alam neighborhoods. Integrated techniques include social, cognitive, and technological tactics.

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1. INTRODUCTION

Littering, which is the act of improper disposal of waste, contributes to pollution and poses a significant threat to the environment. It has become a major concern in many countries, particularly in developing ones (Ojedokun et al., 2022). Any solid or liquid household or commercial waste is referred to as litter. This can range from small items to large items, including soft drink bottles, glass, metal, cigarette butts, small pieces of paper, chips, fabrics, candy wrappers, fast-food packaging, plastic straws, food, discarded vehicles, construction or demolition materials, yard waste and trimmings (Arafat et al., 2007). Litter can damage the quality of the habitat in the long run, affect the visual and cause an unpleasant odour in the area. In addition, litter can pollute soil and water, endanger the health of wildlife by increasing the reliance on litter as a food source and threaten the health of visitors by increasing the number of bees, flies, and other pests in the area (Cingolani et al., 2016; Rodríguez-Rodríguez, 2012). According to Abdul Aziz et al. (2019), urban greenspaces have various recreational impacts, including littering. Greenspaces, such as national parks and woodlands, protect biological diversity, resources, landscape formation, inanimate natural components, and landscape beauty or restore damaged and covered natural habitats (Arpin & Cosson, 2015; Grazhdani, 2016).

National parks are accessible to visitors, open to the public, and bring numerous benefits. However, as genuine tourists are increasingly interested in visiting these protected areas, the park management needs some help on resources, infrastructure and enforcement in order to maintain the parks and address problems such as littering. The increase in public littering is caused by several reasons: insufficient infrastructure, habit, laziness, the lack of enforcement, and the dirtiness of the street (Moqbel et al., 2020). These challenges include air and water quality issues, noise pollution, and overcrowding. In addition to the problems, the generation of waste, waste management, disposal, and litter are all directly linked to the increase in the number of visitations concerning park managers. From the perspective of sustainability, waste management in natural areas has become an increasingly popular topic worldwide and has become an increasingly important field of research (Hu et al., 2018; Marion & Reid, 2007; Rodríguez-Rodríguez, 2012). Research has shown that inadequate or non-existent environmental “awareness” may affect individuals’ littering behaviour (Sharp et al., 2010). The follow-up study by Abdul Aziz et al. (2019) found that 46.1% of the respondent’s litter problem is due to insufficient trash cans.

Substantial studies and initiatives to control this issue have been implemented in various countries and locations, such as the beach, mountain areas, and streets. Nevertheless, litter can still be found in most public places ranging from urban to rural areas and significant city residential areas to recreational forests. In addition, some studies also have investigated the types of pro-environmental behaviour within the national park boundaries (Esfandiar et al., 2021). This paper categorises some of the variables that influence littering behaviour in Shah Alam and recommends measures and actions to tackle these problems. Therefore, the aim is to (i) identify the sociodemographic background

and littering behaviour of people in greenspace and (ii) determine the association between littering in greenspace of people with sociodemographic characteristics.

2. MATERIALS AND METHODS

2.1. Study Area

The study was conducted at 23 green spaces in Shah Alam, the capital of Selangor. The city is a newly developing town undergoing rapid population growth and industrial and technological development. Its population was estimated in 2021 at around 617 149 people with an area of 290.3 km². The city has many recreational parks and green space areas and has been experiencing major solid waste management problems (Omar, 2008).

2.2. Study Design and Population Size

The study is a quantitative cross-sectional study using an online questionnaire. This study encompasses the Greenspace area located in Shah Alam and involves people residing and visiting the Greenspace in Shah Alam, Selangor. The final sample size of N = 384 was calculated using Raosoft, Inc.'s calculator (2004), using a 95% confidence level and a 5% acceptable error. However, only 250 (65%) questionnaires were successfully collected after two months of data collection.

2.3. Measurement Instruments

The respondents were invited to complete the online questionnaire about littering behaviour, waste disposal, and perception of cleaning responsibilities in the park. A modified and validated questionnaire written in bi-languages (Malay and English) was used as an assessment tool (Abdul Aziz et al., 2019; Arafat et al., 2007). The questionnaire comprises three main parts: (1) the socio-demographic characteristics of the respondents. It included ten questions of independent variables regarding respondents' age, gender, marital status, number of children, educational level, and monthly income. The second part (2) assesses respondents' knowledge, attitude, and practice on littering and waste disposal. The final part (3) covers the respondent's perception of cleaning responsibilities in Greenspace. This section consists of seven questions involving the person thinking about the responsibility of greenspace cleanliness.

2.4. Pilot Study

A pilot study was conducted to determine the feasibility and reliability of the questionnaire was measured using Cronbach's alpha coefficient with reliability coefficients ($\alpha = 0.63$). According to Ursachi et al. (2015) α of 0.6 to 0.7 or greater indicates that the reliability was acceptable, and 0.8 or greater is considered excellent.

3. RESULTS AND DISCUSSION

In all 384 residents and visitors of Shah Alam were invited to participate; 250 completed the survey with a 65% response rate. The socio-demographic characteristics of participants are presented in Table 1. Most respondents were females (73.3%), singles, and within the age group of 21-30. In addition, most of the respondents were students and indicated higher educational levels (86.9%).

Table 1. Sociodemographic profile of respondents

Independent group	Number of respondents	Percent (%)
<i>Gender</i>		
Male	67	26.8
Female	183	73.2
<i>Age</i>		
18 – 20	27	10.8
21 – 30	157	62.8
31 – 40	16	6.4
41 – 50	37	14.8
>51	13	5.2
<i>Marital status</i>		
Single	176	70.4
Married	70	28.0
Widowed	4	1.6
<i>Number of children</i>		
No	178	71.2
1 to 2	18	7.2
3 to 5	47	18.8
More than 5	7	2.8
<i>Educational level</i>		
Secondary	14	5.6
Certificate	17	6.8
Higher education	215	86.0
Others	4	1.6
<i>Monthly income (RM)</i>		
No income	135	54.0
Under 1000	22	8.8
1000 – 3000	35	14.0
3001 – 5000	23	9.2
5001 – 7000	17	6.8
Above 7001	18	7.2

3.1. Littering in the Park

Table 2 presents the survey on littering in the park. Most of the residents and visitors of Shah Alam claimed that they threw litter in the park (76%), but some admitted littering only when there is no nearby dustbin (13.6%), or sometimes (10%) or mostly in the past (0.4%). The most common litter items were beverage containers (40.8%), such as cans, glass, and plastic, followed by food waste (19.6%). The respondents also indicated the main reason for littering in the park as one of the habits or might be due to insufficient availability of dustbins and laziness.

Table 2. Overall respondents' response to the survey question on littering

Question (dependent group)	Answer	Percentage of respondents (%)
Littering in the park (Greenspace)	Never	76.0
	No nearby dustbins	13.6
	Sometimes	10.0
	Most of the time	0.4
Types of litter items usually throw	Beverage container (can, glass, plastic)	40.8
	Cigarette butts	6.0
	Food waste	19.6
	Drinking straw	9.2

Question (dependent group)	Answer	Percentage of respondents (%)
Leading driving cause of people's litter	Chewing gum	5.6
	Tissue	12.0
	Paper advertisements, newspapers, flyers	2.8
	Face mask	4.0
	Availability of dustbin	20.8
	Habit	35.6
	Laziness	18.4
	The dirtiness of the park	8.0
	Lack of enforcement	11.2
	For fun	6.0
Most effective in preventing throwing litter in the park (Greenspace)	Fines	31.6
	Negative image	10.0
	Moral and religious convictions	13.6
	Better street cleanliness	11.2
	Public awareness campaigns	12.4
	Increased availability of dustbins	20.0
	Nothing will stop me from littering	1.2
	Citizens	1.2
	Municipality	0.4
	Both	98.0
Willingness to participate in a public cleaning campaign	Not sure	0.4
	Yes	71.2
	No	3.6
	Not sure	22.8
	Such campaigns make no difference	2.4

On the other hand, from our findings, the most influential factors that help prevent littering in the park or Greenspace are fines (31.6%), followed by the increased availability of dustbins (20%). Regarding responsibility for Greenspace's cleanliness, practically all respondents (98%) agreed that the municipality and the citizens are accountable for the cleanliness. On top of that, most respondents also positively decided to volunteer in a general cleaning campaign in the future, while 2.4% argued that such a campaign makes no difference.

3.2. Effect of Gender on Littering

Table 3 shows the finding on littering in the park by gender, revealed two out of five variables have a statistically significant relationship littering frequency has a significant relationship with gender, $X^2(3, N = 250) = 26.447, P < 0.01$. The results indicate that males (7.5%)

littered 'most of the time' than females (0.5%). Other research has generally reported results for littering according to gender from Al-Khatib et al. (2009) and Abdul Aziz et al. (2019) that males are more likely to litter than females. In terms of types of litter items, the test revealed the relationship with gender, $X^2(7, N = 250) = 19.569, P = 0.007$. Based on the survey, males give a higher percentage (14.9%) of throwing cigarette butts than females (2.7%).

According to Chinwong et al. (2018), males (67%) are more likely to smoke every day than females (41.9%), which explains the results. Two opposing findings are shown by publications on the disparities between littering by male and female: males have a higher pregnancy rate than females and littering is unaffected by gender (Moqbel et al., 2019; Schultz et al., 2011). The study's findings could explain some of these discrepancies in literature reporting.

Table 3. Littering in the park by gender (*p value <0.05)

Question	Answer	Percentage of responders (%)		(df)	P-value
		Male	Female		
Littering in the park (Greenspace)	Never	52.2	82.0	26.447 (3)	0.000*
	No nearby dustbins	23.9	10.4		
	Sometimes	16.4	7.1		
	Most of the time	7.5	0.5		
Types of litter items usually throw	Beverage container	41.8	40.4	19.569 (7)	0.007*
	Cigarette butts	14.9	2.7		
	Food waste	19.4	19.7		
	Drinking straw	3.0	11.5		
	Chewing gum	7.5	4.9		
	Tissue	10.4	12.6		
	Paper advertisement, newspaper, flyers	0.0	3.8		
	Face mask	3.0	4.4		
Leading driving cause of people's litter	Availability of dustbin	22.4	20.2	7.080 (5)	0.215
	Habit	43.3	32.8		
	Laziness	17.9	18.6		
	The dirtiness of the park	9.0	7.7		
	Lack of enforcement	6.0	13.1		
	For fun	1.5	7.7		
Greenspace cleanliness responsibility	Fines	31.3	31.7	5.221 (6)	0.516
	Negative image	7.5	10.9		
	Moral and religious convictions	9.0	15.3		
	Better street cleanliness	13.4	10.4		
	Public awareness campaign	13.4	12.0		
	Increased availability of dustbins	22.4	19.1		
	Nothing will stop me from littering	3.0	0.5		
Willingness to participate in a public cleaning campaign	Yes	61.2	74.9	5.602 (3)	0.133
	No	6.0	2.7		
	Not sure	28.4	20.8		
	Such campaigns make no difference	4.5	1.6		

3.3. Effect of Age on Littering

Table 4 shows the overall respondents' response correlating the age of respondents to littering with a significant Pearson's Chi-square test, $X^2(12, N = 250) = 25.649, P = 0.012$. In all age groups, the most common response to the question "have you ever thrown litter in the park (greenspace)?" was never. Interestingly, age had an impact as younger respondents aged 18–20 (59.3%) admitted to littering most of the time than older respondents, older than 41 years (0.0%). These results are consistent with the previous study (Arafat et al., 2007), where only 11% of the older age group, older than 50 years, admitted to 'mostly' throwing litter in the street, compared to 28% of younger

respondents aged 12 to 14 years. For the younger respondents, 18–20 years, moral and religious convictions (25.9%) were the most effective in preventing littering. In contrast, increased availability of dustbins (38.5%) was identified in the older age group over 51 years. Finally, most respondents claimed to be positively willing to participate in the cleaning campaign. This is consistent with a prior finding that age and gender had an impact on attitudes and behaviors related to street littering. Young people litter more because they are more prone to break the law, care less about it and its effects, and are typically unafraid of the punitive measures put in place to reduce littering (Ojedokun et al., 2022).

Table 4. Littering in the park by age

Question	Answer	Percentage of responders (%)					(df)	P-value
		18-20	21-30	31-40	41-50	>51		
Littering in the park (Greenspace)	Never	48.1	72.6	62.5	97.3	92.3	25.649 (12)	0.012*
	No nearby dustbins	25.9	15.3	18.8	2.7	0		
	Sometimes	18.5	10.2	12.5	0	7.7		
	Most of the time	7.4	1.9	6.2	0	0		
Greenspace cleanliness responsibility	Citizens	3.7	1.3	0.0	0.0	0.0	17.485 (12)	0.132
	Municipality	0.0	0.0	6.2	0.0	0.0		
	Both	96.3	98.1	93.8	100.0	100.0		
	Not sure	0.0	0.0	0.0	0.0	0.0		
Leading driving cause of people's litter	Availability of dustbin	18.5	21.0	12.5	24.3	23.1	12.724 (20)	0.889
	Habit	29.6	36.9	31.2	37.8	30.8		
	Laziness	25.9	15.9	18.8	18.9	30.8		
	The dirtiness of the park	14.8	8.9	6.2	2.7	0.0		
	Lack of enforcement	7.4	10.2	25.0	10.8	15.4		
	For fun	3.7	7.0	6.2	5.4	0.0		
	Willingness to participate in a public cleaning campaign	Such campaigns make no difference	0	3.2	6.2	0		

3.4. Effect of Marital on Littering

Based on Table 5, the analysis revealed that one of the four dependent variables was statistically significant, $X^2(6, N = 250) = 14.462, P = 0.025$. Overall, the respondent's response to the question related to willingness to participate in a general cleaning campaign in the future was positive for both single (73.9%) and married (68.6%). Interestingly, widows are more determined with their opinion to answer 'not sure' when asked about participation in such a campaign. However, the number of widowed respondents who participated in this study was significantly low, with only

four respondents. The test also revealed that single had admitted to litter "most of the time" (0.6%), compared to married and widowed (0%). This result agrees with previous findings by Abdul Aziz et al. (2019) where they found that singles are more likely to litter than marital status groups. Similar results also have been reported by Al-Khatib et al. (2009) that people who are married and widowed litter less often than single people. Married people and widow(ers), who are often older, are believed to have better levels of social maturity and stability, which will lessen their inclination to litter.

Table 5. Littering in the park by marital status

Question	Answer	Percentage of responders (%)			(df)	P-value
		Single	Married	Widowed		
Greenspace littering	Never	71.6	87.1	75.0	7.857 (6)	0.249
	No nearby dustbins	15.9	7.1	25.0		
	Sometimes	11.9	5.7	0		
	Most of the time	0.6	0	0		
Types of litter items usually throw	Beverage container (can, glass, plastic)	38.1	47.1	50.0	10.535 (14)	0.722
	Cigarette butts	6.8	4.3	0.0		
	Food waste	18.8	21.4	25.0		
	Drinking straw	9.7	8.6	0.0		
	Chewing gum	6.8	2.9	0.0		
	Tissue	12.5	11.4	0.0		
	Paper advertisement, newspaper, flyers	2.8	2.9	0.0		
	Face mask	4.5	1.4	25.0		

Question	Answer	Percentage of responders (%)			(df)	P-value
		Single	Married	Widowed		
Most effective in preventing throwing litter in the park (Greenspace)	Fines	32.4	30.0	25.0	19.263 (12)	0.082
	Negative image	8.5	11.4	50.0		
	Moral and religious convictions	15.3	10.0	0.0		
	Better street cleanliness	13.6	4.3	25.0		
	Public awareness campaigns	12.5	12.9	0.0		
	Increased availability of dustbins	16.5	30.0	0.0		
	Nothing will stop me from littering	1.1	1.4	0.0		
Willingness to participate in a public cleaning campaign	Yes	73.9	68.6	0.0	14.462 (6)	0.025*
	No	3.4	4.3	0.0		
	Not sure	20.5	24.3	100.0		
	Such campaigns make no difference	2.3	2.9	0.0		

3.5. Effect of Number of Children on Littering

Table 6 summarizes the effect of the number of children on littering. Pearson's Chi-square test ($\alpha < 0.05$) revealed no significant relationship between the number of children and littering. The result contradicts the previous study in three national parks in United States of America. The study reported that visitors with children in their groups were 1.51 times more likely to dispose of waste properly than those without children (Mateer et al., 2020). This study falls in line with Larsson et al. (2010) and Gentina and Muratore (2012), where they stated that children might encourage family's pro-environmental behaviors, and people with

children are more concerned about the planet and environment in the future (Dupont, 2004; Laroche et al., 2001). The questionnaire revealed that the majority of the respondents with more than five children admitted to not littering in the park. In contrast, about 0.6% of respondents with no children admitted to litter most of the time. Therefore, one would expect that people with children litter less than people with no children as their behaviors influence the children's development. However, based on Table 1, only seven respondents with more than five children participated in this study. In contrast, the majority of respondents do not have children, limiting the study's ability to establish a definitive relationship.

Table 6. Littering in the park by number of children

Question	Answer	Percentage of responders (%)				(df)	P-value
		No	1 to 2	3 to 5	More than 5		
Greenspace littering	Never	71.3	66.7	93.6	100.0	16.281 (9)	0.061
	No nearby dustbins	15.7	22.2	4.3	0.0		
	Sometimes	12.4	11.1	2.1	0.0		
	Most of the time	0.6	0.0	0.0	0.0		
Leading driving cause of people's litter	Insufficient availability of dustbin	20.8	16.7	19.1	42.9	12.576 (15)	0.635
	Habit	35.4	38.9	36.2	28.6		
	Laziness	18.0	16.7	23.4	0.0		
	Dirtiness of the park	10.1	5.6	2.1	0.0		
	Lack of enforcement	9.0	16.7	17.0	14.3		
Most effective in preventing throwing litter in the park (Greenspace)	For fun	6.7	5.6	2.1	14.3	17.191 (18)	0.510
	Fines	31.5	33.3	34.0	14.3		
	Negative image	9.6	11.1	10.6	14.3		
	Moral and religious convictions	15.2	5.6	10.6	14.3		
	Better street cleanliness	14.0	5.6	4.3	0.0		
Public awareness campaigns	12.4	5.6	12.8	28.6			

Question	Answer	Percentage of responders (%)				(df)	P-value
		No	1 to 2	3 to 5	More than 5		
Willingness to participate in a public cleaning campaign	Increased availability of dustbins	16.3	33.3	27.7	28.6	8.170 (9)	0.517
	Nothing will stop me from littering	1.1	5.6	0.0	0.0		
	Yes	72.5	83.3	61.7	71.4		
	No	3.4	0.0	6.4	0.0		
Willingness to participate in a public cleaning campaign	Not sure	21.3	11.1	31.9	28.6		
	Such campaigns make no difference	2.8	5.6	0.0	0.0		
	Such campaigns make no difference	2.8	5.6	0.0	0.0		

3.6. Effect of Gender on Littering

Based on Table 7, the highest percentage of responses regarding throwing litter in the park was never in all levels of education. The beverage container was the highest category of litter item in all levels of education, followed by food waste in secondary (28.6%) and certificate (23.5%). Analyzing respondents' responses to littering on an educational level educational level of respondent did not show any significant differences. The result was inconsistent with the previous findings, Liu et al. (2020) showed that knowledge has a direct positive impact on visitors' intentions to engage in pro-environmental activities. Another study by Moqbel et al. (2020) indicates that although educational level has a low influence on littering, people with higher education have a better response to anti-littering motivation, consistent with Arafat et al. (2007). In a study done by Nkwocha and Okeoma (2009) observed

that the educational levels often did not correspond with the everyday hygiene practices as seen in the streets. For instance, it was noted throughout the interview that younger individuals had trouble disposing of their trash. This helped to explain why some of them, even the lettered ones, would trash on the streets. All of these findings indicated that three factors—improving civic education among urban inhabitants, changing public attitudes and behaviours beginning at the home level, and stringent enforcement of littering laws—remain crucial in lowering the prevalence of street littering (Nkwocha & Okeoma, 2009). Similar report by Eastman et al. (2013) reported that the majority of individuals with college or graduate school education indicated they never litter, much more than lower education groups, and over half of the participants acknowledged having littered in some fashion (Eastman et al., 2013). This leads to the conclusion that people with some education should practice and display excellent social manners.

Table 7. The relationship between the level of education and littering

Question	Answer	Percentage of responders (%)				(df)	P-value
		Secondary	Certificate	Higher education	Others		
Have you ever thrown litter in the park (greenspace)?	Never	78.6	70.6	76.3	75.0	4.75 0 (9)	0.856
	Only when there are no nearby dustbins	7.1	23.5	13.5	0.0		
	Sometimes	14.3	5.9	9.8	25.0		
	Most of the time	0.0	0.0	0.5	0.0		
In your opinion, greenspace cleanliness is the responsibility of whom?	The citizens only	0.0	0.0	1.4	0.0	0.83 1 (9)	1.000
	The municipality only	0.0	0.0	0.5	0.0		
	Both citizen and municipality	100.0	100.0	97.7	100.0		
	Not sure	0.0	0.0	0.5	0.0		
In your opinion, which of the main driving cause people to litter?	Insufficient availability of dustbin	21.4	11.8	20.9	50.0	9.10 7 (15)	0.872
	Habit	35.7	41.2	35.3	25.0		
	Laziness	28.6	11.8	18.6	0.0		
	Dirtiness of the park	0.0	17.6	7.9	0.0		
	Lack of enforcement	7.1	5.9	6.0	0.0		
	For fun	7.1	5.9	6.0	0.0		
Are you willing to participate in a public cleaning campaign in the future?	Yes	57.1	64.7	73.0	50.0	8.21 1 (9)	0.513
	No	0.0	0.0	4.2	0.0		
	Not sure	42.9	29.4	20.5	50.0		
	Such campaigns make no difference	0.0	5.9	2.3	0.0		

3.7. Effect of Monthly Income on Littering

Table 8 summarizes the overall respondent's response based on monthly income and littering status. Many believe people with high income with higher social and educational levels may influence litter reduction.¹⁵ However, the Pearson Chi-square test revealed no statistically significant differences ($\alpha < 0.05$) between monthly income and littering status. One would expect that high income, which is usually associated with higher social and educational status, should contribute to litter reduction. It is possible to explain this observation based on the “subconscious psychological self-defense” theory (Al-Khatib et al., 2009). This result contradicts the prior study that found that littering is more prevalent in areas occupied by lower-income people (Asmui et al., 2019). Asmui et al. (2019) also found that the association between students' awareness and littering behaviour at higher education institutions was influenced by family income, either from lower or higher income groups. Results showed 5.6% of people with monthly income above RM7001 and 2.2% of people with no income litter most of the time in the park. This shows that monthly income has no significant relationship with littering behaviour among respondents. Moreover, the most littered items usually people throw are beverage containers, followed by food waste and tissue. When asked about participation in general cleaning campaigns, 11.1% of people with income above RM7001 show no interest in such movement.

3.8. Association Between Sociodemographic Characteristics with the Knowledge on Littering

This study investigated the association between sociodemographic background and littering behaviour in greenspace in Shah Alam. However, Survey data shows other helpful information, including the knowledge of sociodemographic factors' impact on littering behaviour. A Pearson's Chi-square test (with $\alpha < 0.05$) was performed to evaluate the respondents' knowledge of littering. Based on Table IX, the analysis revealed that only one dependent variable, marital status was statistically significant, $X^2(4, N = 250) = 9.427, P = 0.050$ with the knowledge of littering behaviour. The result summarized that Shah Alam people were primarily high in knowledge level. Miller and Burbach (2017) found that understanding environmental theory has a substantial favourable impact on attitudes about conduct.

Similar findings were made by Soares et al. (2021) found that pro-environmental conduct was strongly related with knowledge of the socioeconomic, health, and bio-ecological effects of plastic littering. Smokers may not be aware that tossing small cigarette butts into the environment may have long-term effects since many individuals do not become aware of the effects of littering. Studies suggest that encouraging someone to dispose of their trash in a more suitable container will make them better off. Such a person may also protect their values by engaging their family and neighbors when they see others violating their rights (by littering) (Oguntayo et al., 2019). Thus, this shows that those with greater degrees of knowledge about littering littered less than people with lower levels of knowledge.

Table 8. The relationship between monthly income and littering

Question	Answer	Percentage of responders (%)						(df)	P-value
		No income	Under RM 1000	RM 1000 - 3000	RM 3000 - 5000	RM 5001- 7000	Above RM 7001		
Have you ever thrown litter in the park (greenspace)?	Never	67.4	77.3	71.4	87.0	94.1	88.9	16.006 (15)	0.382
	Only when there is no nearby dustbins	18.5	13.6	14.3	8.7	0.0	0.0		
	Sometimes	11.9	9.1	8.6	4.3	5.9	5.6		
	Most of the time	2.2	0.0	5.7	0.0	0.0	5.6		
Greenspace cleanliness is the responsibility of whom?	The citizens only	1.5	4.5	0.0	0.0	0.0	0.0	19.906 (15)	0.176
	The municipality only	0.0	0.0	2.9	0.0	0.0	0.0		
	Both the citizen and municipality	98.5	90.9	97.1	100.0	100.0	100.0		
	Not sure	0.0	4.5	0.0	0.0	0.0	0.0		

Question	Answer	Percentage of responders (%)						(df)	P-value
		No income	Under RM 1000	RM 1000 - RM 3000	RM 3000 - RM 5000	RM 5001 - RM 7000	Above RM 7001		
Are you willing to participate in a public cleaning campaign in the future?	Yes	77.8	77.3	60.0	56.5	64.7	61.1	20.095 (15)	0.168
	No	3.0	0.0	8.6	0.0	0.0	11.1		
	Not sure	18.5	22.7	25.7	39.1	29.4	22.2		
	Such campaigns make no difference	0.7	0.0	5.7	4.3	5.9	5.6		

Table 9. Association between sociodemographic factors with the knowledge level of littering behaviour

Variables	Category	Knowledge, n (%)			(df)	P-value
		Good	Moderate	Poor		
Age group	18 - 20	25 (92.6)	2 (7.4)	0 (0.0)	14.233 (8)	0.076
	21 - 30	120 (76.4)	32 (20.4)	5 (3.2)		
	31 - 40	13 (81.2)	3 (18.8)	0 (0.0)		
	41 - 50	29 (78.4)	6 (16.2)	2 (5.4)		
	>51	6 (46.2)	5 (38.5)	2 (15.4)		
Gender	Male	51 (76.1)	14 (20.9)	2 (3.0)	0.247 (2)	0.884
	Female	142 (77.6)	34 (18.6)	7 (3.8)		
Marital status	Single	141 (80.1)	31 (17.6)	4 (2.3)	9.427 (4)	0.050*
	Married	49 (70.0)	17 (24.3)	4 (5.7)		
	Widowed	3 (75.0)	0 (0.0)	1 (25.0)		
Number of children	No children	141 (79.2)	32 (18.0)	5 (2.8)	6.716 (6)	0.348
	1 to 2	12 (66.7)	6 (33.3)	0 (0.0)		
	3 to 5	35 (74.5)	9 (19.1)	3 (6.4)		
Educational level	More than 5	5 (71.4)	1 (14.3)	1 (14.3)	10.220 (6)	0.116
	Secondary	12 (85.7)	0 (0.0)	2 (14.3)		
	Certificate	14 (82.4)	2 (11.8)	1 (5.9)		
	Higher education	163 (75.8)	46 (21.4)	6 (2.8)		
Occupation	Others	4 (100.0)	0 (0.0)	0 (0.0)	14.282 (8)	0.075
	Working	64 (77.1)	17 (20.5)	2 (2.4)		
	Unemployed	5 (83.3)	1 (16.7)	0 (0.0)		
	Housewife	9 (64.3)	2 (14.3)	3 (21.4)		
	Student	113 (78.5)	27 (18.8)	4 (2.8)		
Monthly income	Pensioner	2 (66.7)	1 (33.3)	0 (0.0)	6.201 (10)	0.798
	No income	122 (93.8)	6 (4.6)	2 (1.5)		
	Under RM1000	19 (95.0)	1 (5.0)	0 (0.0)		
	RM1000 – RM3000	32 (100.0)	0 (0.0)	0 (0.0)		
	RM3001 – RM5000	21 (91.3)	1 (4.3)	1 (4.3)		
	RM5001 – RM7000	17 (100.0)	0 (0.0)	0 (0.0)		
	Above RM7001	17 (100.0)	0 (0.0)	0 (0.0)		

4. CONCLUSION

Although the importance of studying littering in waste management and pollution control cannot be overstated, there is a lack of academic research on this topic, especially in greenspaces in Shah Alam and other developing countries. This study explored the causes and behaviours that contribute to littering, as well as the types of items commonly left behind. The study reveals that there are three important sociodemographic factors that have a significant impact on littering behaviour in Shah Alam: age, gender, and marital status. For example, it was observed that littering was more

common among younger individuals and men. The study's findings highlight the importance of a comprehensive approach to litter prevention, incorporating social, cognitive, and technological methods. As an illustration, cognitive strategies could include public education campaigns aimed at discouraging littering, while social approaches might prioritise stricter penalties for those who litter. In addition, improving the accessibility of trash cans and consistently conducting clean-up initiatives are practical steps to reduce littering. This study offers valuable insights for policymakers in developing more effective litter prevention and waste management strategies, especially in urban greenspaces such as those in Shah Alam.

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