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KNOWLEDGE, ATTITUDE, AND THEIR IMPACT ON HOUSEHOLD SOLID WASTE DISPOSAL PRACTICES IN SELANGOR

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Abstract: Improper household solid waste disposal practices, such as discarding waste into drains, continue to pose significant environmental and public health challenges in Selangor, Malaysia. While knowledge and attitude are widely recognised as key factors influencing responsible waste-related behaviour among households, their combined impact has not been extensively examined at the local level. This study investigates the relationship between household knowledge, attitudes, and solid waste disposal practices in Selangor, a state grappling with an escalating solid waste management (SWM) crisis, driven by rapid urbanisation and rising domestic waste generation. Adopting a quantitative, cross-sectional survey design, data were collected from households across various municipalities in Selangor via a structured online questionnaire. Analysis using SPSS revealed a high average knowledge score (mean = 4.0) and positive attitudes (mean = 4.18) towards waste management. However, the average score for disposal practices was moderate (mean = 2.98), highlighting a disconnect between knowledge, attitude, and actual behaviour. The results indicate that although environmental awareness and concern are widespread, behavioural barriers impede consistent waste segregation and proper disposal. The study underscores the need for strengthened public education and targeted behavioural interventions to address this gap. The results are intended to support policymakers and local authorities in developing more effective, community-centred waste management strategies aligned with sustainability objectives.

Keywords: Household knowledge, Household attitude, Solid Waste Management (SWM), Solid waste disposal, Local authority

1. Introduction

Solid waste management (SWM) has emerged as a pressing global challenge, driven by population growth, urbanisation, industrialisation, and evolving consumer lifestyles. According to Iheukwumere et al. (2020), the rapid increase in waste generation particularly in developing countries necessitates urgent and effective SWM strategies to avert severe environmental consequences. Statistics from the Malaysia Investment Development Authority (MIDA) indicate that, with a population of 32.7 million in 2021 and an annual growth rate of 0.2 percent, Malaysia recorded an average waste generation rate of 1.17 kg per capita per day (Shahril, 2022). The country produces approximately 38,000 metric tonnes of waste daily, yet only 24 percent is recycled, while the remaining 76 percent is disposed of in landfills (Zainal, 2023) These landfills are rapidly reaching full capacity, while waste continues to

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accumulate. In some areas, excessive dumping has led to the formation of so-called "trash mountains" (Sarpong & Alarussi, 2022)

A household is defined as a group of individuals who share a living space and pool resources to meet collective needs, distinguished by their cooperative arrangement for fulfilling basic necessities (Easy Sociology, 2024). The majority of community waste originates from household activities, including cleaning, food preparation, house sweeping, fuel burning, and other domestic routines. Moreover, households contribute to solid waste generation by discarding used equipment, worn clothing, old furniture, and various paper products such as newspapers and books (Masngut & Mohamad, 2021) Proper management of this waste is essential for safeguarding public health and protecting the environment, as improper disposal contributes to pollution and elevated health risks (Hassan & Elsehry, 2022; Omer, 2021). The challenges are further intensified by urbanisation, as migration to urban centres in search of economic opportunities leads to increased household consumption and, consequently, higher waste generation (Sen, 2022).

1.1 Problem Statement

Selangor, Malaysia's most industrialised and populous state, lies at the epicentre of the nation's escalating solid waste management (SWM) crisis. Generating an estimated 10,000 tonnes of waste daily, 7,000 tonnes of which is domestic waste, Selangor epitomises the national challenge of managing increasing volumes of municipal solid waste (MSW) in the context of rapid urbanisation and population growth (Business Today, 2022). Despite policy initiatives and legal frameworks such as the Solid Waste and Public Cleansing Management Act 2007, Malaysia continues to rely predominantly on landfilling, with 95 percent of its MSW disposed of in landfills, 85 percent of which have already reached full capacity (Husna Abdul Halim et al., 2022). Improper solid waste disposal remains a significant concern, particularly practices such as discarding waste into drains, which contribute to environmental degradation and present serious public health risks. Ngalo and Thondhlana (2023) highlight that illegal dumping, including the disposal of household waste into drains, is often driven by inadequate access to waste bins and irregular waste collection services.

Household knowledge is a critical factor influencing proper waste disposal. Households with limited understanding of waste segregation are more prone to indiscriminate disposal, thereby exacerbating pollution and health hazards (Musa et al., 2021; Eshete et al., 2023). In many developing regions, including Malaysia, the absence of awareness and formal education leads to substandard waste-handling behaviours, with little emphasis on recycling and composting opportunities (Ssemugabo et al., 2020; Dibia et al., 2022). Attitude is another key determinant of household waste management behaviour. Numerous studies have found that positive attitudes towards environmental sustainability and proper waste disposal correlate with improved practices (Xiaoliang , 2023). Conversely, negative attitudes shaped by perceptions of inconvenience, inefficacy, or cultural norms can deter households from adopting responsible waste practices, even when they possess adequate knowledge (Okumah & Ankomah-Hackman, 2020; E, 2023). Thus, knowledge alone is insufficient; the cultivation of positive attitudes is essential to transform awareness into sustainable behaviour.

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Against this backdrop, this study examines the interaction between knowledge and attitudes in influencing household waste disposal behaviour in Selangor. Despite recognition of these factors in existing research, integrated, localised studies remain limited. This study addresses this gap by assessing household knowledge and attitudes towards solid waste disposal in Malaysia's most waste-intensive state.

2. Literature Review

Solid waste refers to any discarded material in solid form that is neither liquid nor gaseous. It encompasses various waste types generated from routine human activities. As noted by Agarwal (2021) solid waste originates from multiple sectors, including residential, commercial, and industrial activities, and may include both recyclable and non-recyclable materials. Solid waste can be categorised into several types, such as municipal solid waste (MSW), industrial waste, construction and demolition debris, and agricultural waste. Each type possesses distinct characteristics and necessitates specific management strategies (Kwenda et al., 2021). Solid waste can be further categorised based on its source of generation. Municipal solid waste (MSW), derived from residential, commercial, and institutional sources, typically comprises daily discarded items such as food packaging, household refuse, and plastic bottles. The composition of MSW varies considerably depending on geographic location, socio-economic conditions, and seasonal factors (Kwenda et al., 2021).

2.1 Household Waste and Characteristics of Waste

Household waste, also referred to as residential waste, originates from routine domestic activities and includes diverse discarded items such as food scraps, packaging, textiles, and other non-hazardous materials, excluding faeces and hazardous substances (Omer, 2021). Typically, household waste consists of organic matter, recyclable components (such as paper, plastics, and metals), non-recyclable waste, and miscellaneous debris. Its composition is influenced by factors such as household size, income level, and consumption patterns (Phuong et al., 2021) Organic waste particularly food scraps and yard debris often constitutes 30% to 60% of total household waste in urban areas (Hassan et al., 2023) The predominance of organic materials poses environmental challenges, especially when improperly disposed of, as this can result in leachate generation and greenhouse gas emissions, contributing to both soil and air pollution.

Globally, households generate around 2 billion tonnes of waste annually equating to over 60 tonnes per second (The World Counts, 2022). In Malaysia, urbanisation and population growth have significantly increased household waste, with daily generation exceeding 25,000 tonnes (Cheng et al., 2022). Several factors influence household waste generation, including household size, socio-economic status, and lifestyle habits. Larger households typically produce more waste due to higher consumption and domestic activity levels. Per capita waste generation ranges from 0.5 to 2.5 kilograms per day, with total waste volumes increasing proportionally with the number of household members (Hassan & Elsehry, 2022). Households with children often generate greater volumes of organic waste, particularly food-related, due to frequent meal preparation and childcare activities. These

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patterns highlight the necessity of targeted waste management strategies that consider household demographics.

Household income and family structure also affect waste composition. Households with children tend to produce more food waste, while higher-income families often generate more packaging waste due to distinct consumption behaviours (Tonini et al., 2023) Urban households typically produce more waste than rural households, owing to higher consumption levels and broader access to packaged goods and services (Adzawla et al., 2019). The widespread use of convenience foods, disposable items, and single-use packaging in urban areas contributes significantly to the increasing volume of plastic, paper, and cardboard waste. These findings underscore the need for localised and adaptive waste management policies that reflect diverse socio-economic and spatial household contexts.

2.2 Solid Waste Disposal Practices

Disposal represents the final step in the waste management hierarchy, which prioritises waste reduction, reuse, and recycling. Effective disposal methods are essential to minimising the environmental and public health impacts of waste. Inadequate disposal contributes to pollution, health hazards, and depletion of natural resources (Adekola et al., 2021). Proper disposal requires a comprehensive approach encompassing waste identification, collection, segregation, storage, treatment, and final disposal (Benson et al., 2021).

Proper household waste disposal begins with effective segregation. Allison et al. (2024) demonstrated that clear labelling on compostable packaging helps households correctly sort waste into general, food, and recycling bins, significantly improving material recovery rates. Food waste separation, in particular, is vital for sustainable MSW management. Portugal et al. (2020) found that households engaged in responsible food practices such as meal planning and proper storage produce less waste and separate food waste more efficiently. This facilitates the treatment of biodegradable materials, such as composting or biogas generation, which helps reduce methane emissions and supports nutrient recycling.

The success of such treatment processes depends on uncontaminated organic waste. Onyango et al. (2024) found that households practising food waste separation report improved hygiene and cleaner living environments. Effective waste collection systems, supported by waste collectors, are critical in determining how households manage various types of waste, including recyclables, hazardous, and bulky items. Dasmani (2022) notes that households with stronger socio-economic status are more likely to utilise formal waste collection services rather than rely on unsafe or informal methods. Burning is another common disposal method, especially in areas with inadequate waste services. However, open burning contributes significantly to air pollution, harms human health, and accelerates climate change (Saikawa et al., 2020). Mahajan (2023) highlights that this method increases disease prevalence and calls for better systems prioritising recycling and composting.

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Even when awareness is present, improper disposal persists. Komba (2021) observed that many households use a single bin for all waste types. While collecting waste in plastic bags is convenient, failure to separate waste undermines management efforts. Ssemugabo et al. (2020) found that households using inadequate collection methods, such as plastic bags, were more likely to dispose of waste improperly. Atnkut et al. (2025) reported that many households dispose of waste at unauthorised sites including open fields and water bodies largely due to limited collection services. This practice exacerbates environmental degradation and health risks. Similarly, Omang et al. (2021) linked open dumping to increased soil and water contamination and the spread of vector-borne diseases.

2.3 Knowledge of Solid Waste Disposal

Knowledge plays a central role in shaping waste disposal behaviour. It includes awareness of sustainable practices, understanding the consequences of poor disposal, and familiarity with available services. Research by A (2020) found that individuals with greater knowledge demonstrated more positive attitudes and behaviours. Liu et al. (2020) note that when individuals understand waste classification and when policies support proper practices, behavioural alignment with sustainability improves. Prativa Aryal and Prapti Adhikari (2025) found that providing clear information significantly enhances household compliance with disposal practices. Labib et al. (2021) showed that both internal and external influences affect willingness to sort waste. Well-informed households are more likely to participate actively in recycling. Maldaye et al. (2022) identified poor knowledge and negative attitudes as barriers to household-level waste separation.

Arlofa and Febriasari (2023) argued that educational programmes blending theory and practical training improve composting adoption. Aiqin et al. (2020) further confirmed that informed households adopt more sustainable behaviours. Knowledge of the 3R principles Reduce, Reuse, Recycle has been shown to significantly improve waste practices. Prativa Aryal and Prapti Adhikari (2025) stressed that accurate and accessible information supports effective segregation, while Akintunde and Akintunde (2023) showed that environmental education strengthens households' capability and willingness to participate in sustainable practices, fostering long-term behavioural change. Awareness of collection schedules is also important. Qaderi et al. (2021) found that access to reliable schedule information enhances responsible disposal. Sultana et al. (2021) and Kavin Amuthan and Sarika Balaganesh (2023) demonstrated that outreach efforts and timely information reduce improper disposal and its associated risks.

2.4 Attitude Towards Waste Disposal Practices

Attitude is defined as an individual's evaluation of an object, issue, or behaviour (Eagly & Chaiken, 2007; Fauziah Shahul Hamid & Agamuthu Periathamby, 2012). In SWM, attitudes heavily influence household practices. Personality traits such as moral obligation play a role, while societal attitudes may reduce individual accountability (Liu et al., 2020). Tariq et al. (2022) found that despite positive attitudes, barriers such as perceived time constraints limit household willingness to sort waste. Khoo et al. (2022) reported that behavioural intentions significantly influence food waste practices. Labib et al. (2021) added that informed

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individuals are more inclined to engage in recycling programmes. Awareness of waste processes improves adoption of responsible practices. Dibia et al. (2022) noted that education level influences adherence to disposal guidelines.

Kanuku et al. (2020) stressed the importance of recognising proper disposal and its role in compliance. Prativa Aryal and Prapti Adhikari (2025) found disparities in awareness and attitudes linked to education levels (Maldaye et al., 2022). Public perception is also shaped by waste collection efficiency. Adekola et al. (2021) found that inadequate systems reduce compliance, while Setiawan et al. (2024) observed that efficient services encourage responsible behaviour. Sultana et al. (2021) argued that poor infrastructure weakens community engagement, while Eshete et al. (2023) and Yung-Tsan et al. (2024) highlighted the role of well-placed bins and supportive infrastructure in fostering proper disposal. Liu et al. (2020) also emphasised the importance of policy and infrastructure in promoting sustainable behaviour.

3. Research Methodology

This study adopts a quantitative research approach to systematically investigate the relationships between household knowledge, attitudes, and solid waste disposal practices in Selangor. A cross-sectional survey design was employed to collect data at a single point in time, making it suitable for assessing these relationships across a diverse household population. A convenience sampling technique was utilised to select participating households from both urban and rural jurisdictions within Selangor. The sampling frame included city councils such as Petaling Jaya (MBPJ), Shah Alam (MBSA), Subang Jaya (MBSJ), and Klang (MBDK), as well as municipal councils including Kajang (MPKj), Selayang (MPS), Ampang Jaya (MPAJ), Sepang (MPSepang), Kuala Langat (MPKL), Kuala Selangor (MPKS), and Sabak Bernam (MPSB). This inclusive approach ensured representation from urban, suburban, and rural areas, enabling a comprehensive analysis of geographical variations in household waste disposal behaviour.

Data were collected through a structured questionnaire administered via Google Forms, with the survey link distributed to households through WhatsApp groups. Frequencies and descriptive statistics were used to analyse the data, providing empirical insights into the levels of household knowledge and attitudes towards solid waste disposal practices in Selangor.

3.1 Measurement of The Constructs

The questionnaire comprised four sections designed to capture demographic information, household waste disposal practices, knowledge, and attitudes. It followed a structured format using both closed-ended and Likert-scale items, which enabled consistent and quantifiable responses. The Likert scale was used to measure varying degrees of agreement, supporting detailed analysis of respondents' knowledge and attitudes. Table 1 outlines the constructs and the sources from which the measurement items were adopted, adapted, or self-developed. The instrument incorporated validated questions tailored to the

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local context to ensure both reliability and relevance. This approach provided a robust framework for understanding household waste disposal practices in Selangor.

Table 1. Measurement of the Constructs and Sources

Constructs	Source(s)
Solid waste disposal practices	Sultana et al., 2021; Fadhullah et al., 2022; Kasavan et al., 2021
Knowledge of solid waste disposal	Fadhullah et al., 2022; Burdeos et al., 2022; Eshete et al., 2023; Abalajon et al., 2019
Attitudes towards solid waste disposal	Omar (2020); Yap et al., 2022; Zuroni et al., 2018; Eshete et al., 2023

3.2 Data Analysis

Data were analysed using IBM SPSS Statistics version 26. The responses collected via Google Forms were exported into SPSS in .csv format. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarise the demographic characteristics of respondents and their responses to the key constructs.

3.3 Preliminary Assessment

A preliminary reliability assessment was conducted using Cronbach's alpha to evaluate the internal consistency of the multi-item scales used in the questionnaire (e.g., Likert-scale items). A Cronbach's alpha value of 0.70 or higher was considered acceptable, indicating a reliable scale (Burgos-Benavides et al., 2023). As shown in Table 2, the Cronbach's alpha values for the constructs of knowledge of solid waste disposal, attitude towards solid waste disposal, and solid waste disposal practices were 0.873, 0.774, and 0.733 respectively. These results confirm that the scales used in this study demonstrated acceptable levels of internal consistency.

Table 2. Details of Reliability Results

Construct	Cronbach's Alpha	No. of items
Knowledge on Solid Waste Disposal	0.873	13
Attitude Towards Solid Waste Disposal Practice	0.774	15
Solid Waste Disposal Practice	0.733	13

4. Result and Discussion

The questionnaire was administered on 18 December 2024 in both English and Malay, and completed by a convenience sample of 30 respondents from Selangor. As illustrated in Figure 1, the majority of respondents were from three main local authorities: Shah Alam City Council (MBSA), Kajang Municipal Council (MPKj), and Sepang Municipal Council (MPSepang), each contributing 20.0% to the total responses. Collectively, these councils represent 60.0% of the sample population. Other local authorities, including Petaling Jaya City Council (MBPJ), Subang Jaya City Council (MBSJ), Ampang Jaya Municipal Council (MPAJ), and Selayang

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Municipal Council (MPS), each accounted for 6.7% of the responses. This indicates a moderate level of participation from these areas. In contrast, the Klang Royal City Council (MBDK), Hulu Selangor Municipal Council (MPHS), and Kuala Langat Municipal Council (MP Kuala Langat) had the lowest representation, each contributing only 3.3% of the total responses, suggesting minimal coverage in these localities. Figure 2 reveals a notable gender imbalance in the sample, with female respondents comprising 86.7% of participants, compared to only 13.3% male respondents. This suggests that women were significantly more represented in this survey, which may influence the interpretation of gender-related findings.

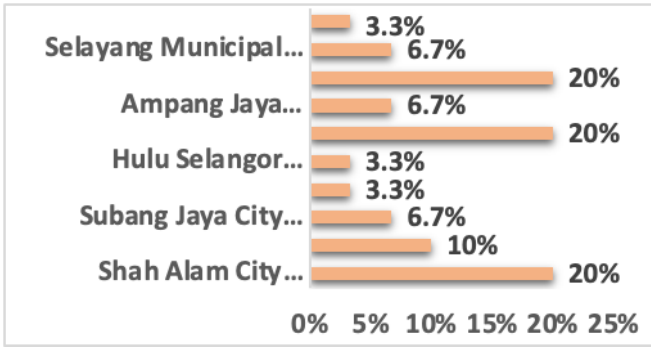

Figure 1. Distribution of Respondents According to Local Authority Jurisdiction

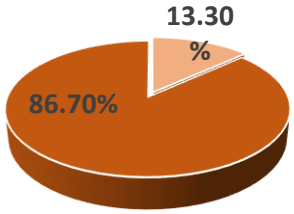

Figure 2. Gender of respondents

Figure 3 indicates that the majority of respondents are aged between 25 and 29 years (53.3%), followed by those aged 30 to 34 years (20.0%). A smaller proportion of the sample falls within the 35 to 39 years age group (10.0%), while 16.7% are aged 45 years or above. Figure 4 reveals that the majority of respondents are married (60.0%), whereas 36.7% are single. A small proportion (3.3%) classified themselves under the “Others” category.

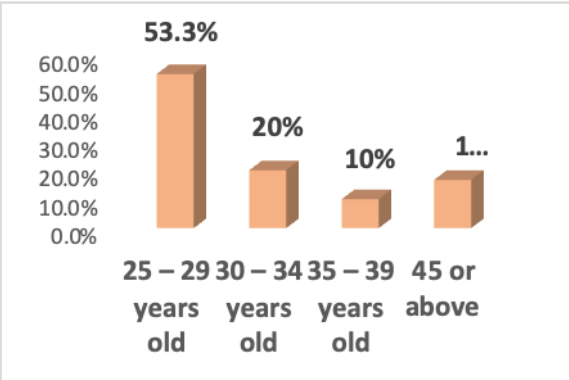

Figure 3. Age Group of Respondents

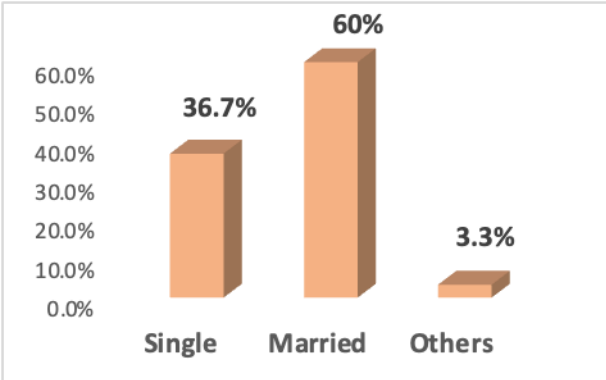

Figure 4. Marital Status of Respondents

Figure 5 illustrates that the vast majority of respondents are Malay (93.3%), with only 6.7% representing other ethnic groups. Figure 6 highlights a generally high level of educational attainment among the respondents. The majority hold a Bachelor's degree (60.0%), followed by 23.3% with a Master’s degree. Smaller proportions possess a Diploma (10.0%) or a PhD (3.3%). Only 3.3% of respondents have completed secondary education (MCE/SPM/SPM(V)).

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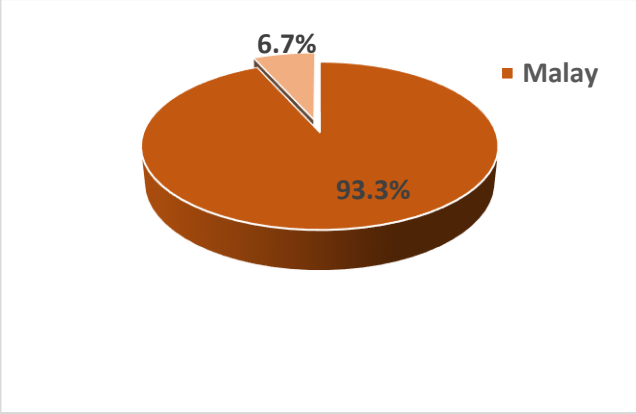

Figure 5. Ethnicity of Respondents

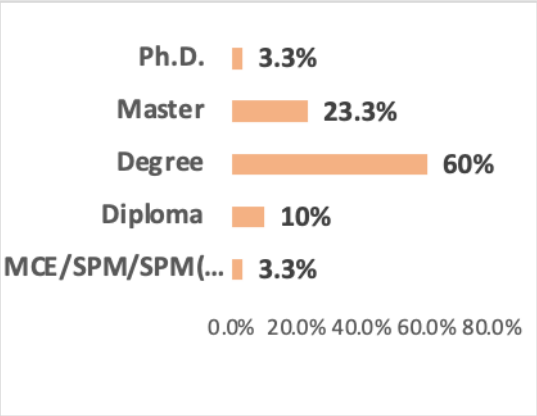

Figure 6. Education Level of Respondents

Figure 7 presents the respondents' employment status, revealing that the majority are employed in the private sector (53.3%). Other significant groups include students, government employees, and housewives, each comprising 10.0% of the sample. Smaller proportions of respondents are self-employed or retirees, each representing 6.7%. The "Others" category accounts for 3.3%, indicating minimal participation from individuals not classified under the specified categories.

Figure 8 displays the income distribution among respondents. The largest proportion (43.3%) earn between RM3,001 and RM5,000, followed by 36.7% who earn between RM1,001 and RM3,000. This suggests that the majority of participants fall within the low-to-middle income range. A smaller percentage (13.3%) earn below RM1,000, while those in the higher-income brackets specifically RM7,001–RM9,000 and above RM11,000 are minimally represented at 3.3% each.

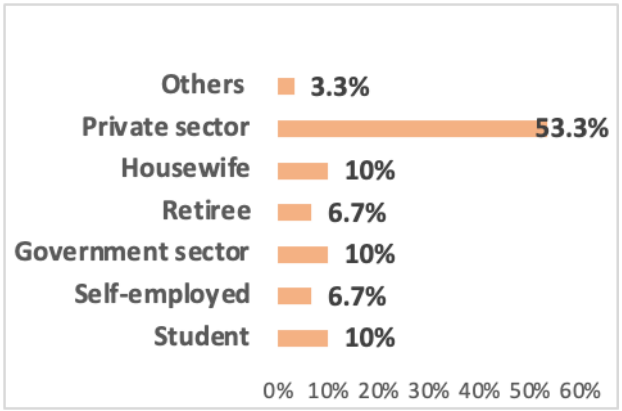

Figure 7. Respondents' Employment Status

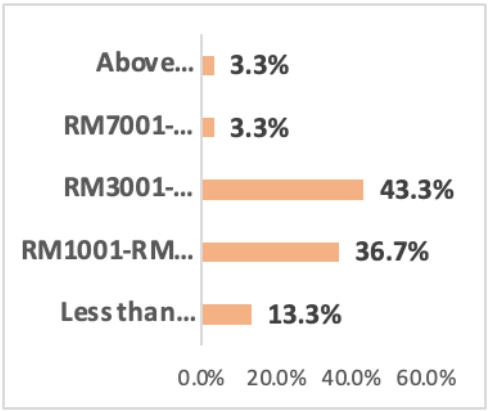

Figure 8. Respondents' Income Distribution

Figure 9 illustrates that respondents reside in a variety of housing types, with the majority (30.0%) living in low-cost apartments. This is followed by 20.0% residing in terrace houses and 16.7% in semi-detached houses. Smaller proportions live in bungalows (6.7%), condominiums (10.0%), and medium-cost apartments (3.3%). The "Others" category accounts

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for 13.3% and comprises responses indicating residence in village houses. Figure 10 shows that most respondents live in households comprising 1 to 3 members (53.3%), followed closely by households with 4 to 6 members (43.3%). Only 3.3% of respondents reported larger households with 7 to 9 members, suggesting that smaller household sizes are predominant within the sample.

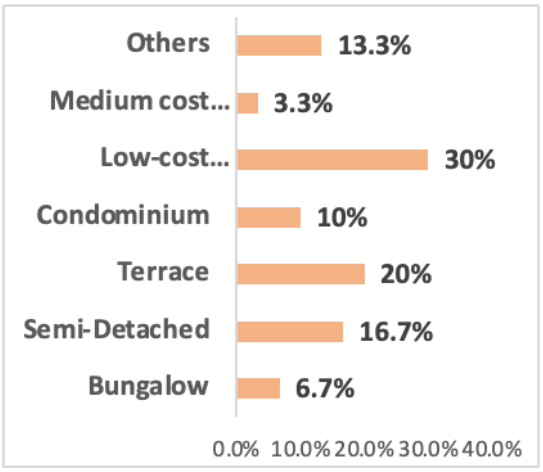

Figure 9. Housing Categories of Respondents

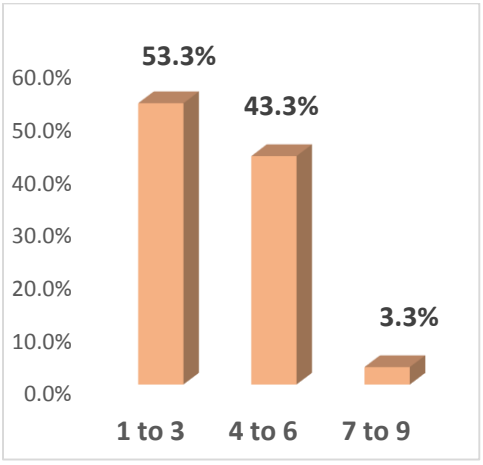

Figure10. Number of Household Members per Respondent

Figure 11 illustrates that all respondents reported disposing of food waste, making it the most common type of household waste. This finding aligns with the typical composition of domestic waste, as food remnants frequently constitute a substantial portion due to routine cooking and consumption activities. Plastic waste is the second most commonly disposed of, with 90% of households reporting its disposal. This underscores the widespread use of plastic in packaging, groceries, and everyday household items. Approximately 70% of respondents reported disposing of bottles and glass items, while 66.7% disposed of used cooking oil—an issue of environmental concern, as improper disposal (e.g., pouring oil down drains) can cause ecological harm and plumbing problems. Over half of the households (53.3%) also dispose of books and paper waste, suggesting another significant waste stream.

Clothing disposal was reported by 33.3% of respondents, while around 20% indicated the disposal of gardening waste. A similar proportion (20.0%) reported disposing of waste tyres, pointing to occasional yet noteworthy waste generation in this category. Construction and demolition debris was disposed of by 16.7% of households, likely linked to small-scale renovation works. E-waste was reported by 13.3% of respondents, highlighting a growing but still limited waste stream. Regulated medical waste, also reported by 13.3%, may be associated with households managing ongoing medical needs. Commercial waste disposal was noted by only 6.7% of households. Finally, household hazardous waste (HHW) and hazardous waste lamps were the least reported, each at just 3.3%, indicating minimal presence of such materials in the domestic waste stream.

Figure 12 shows that the majority of respondents (76.7%) reported using waste disposal bins provided by local authorities. However, 23.3% indicated a lack of access to such facilities. This gap suggests that while most residents benefit from structured waste

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management services, a notable minority may resort to improper disposal methods due to insufficient infrastructure.

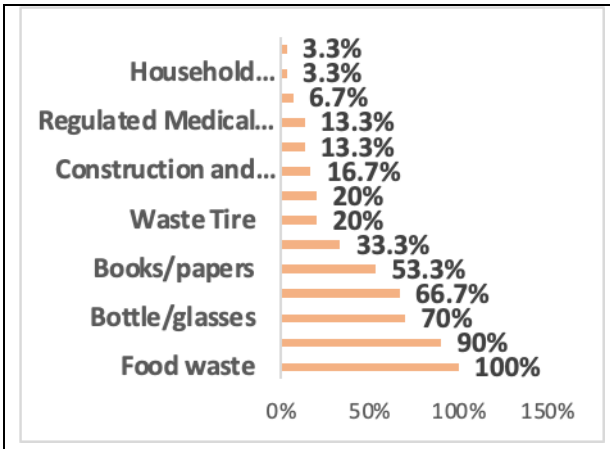

Figure 11. Type of Waste Disposed by Household

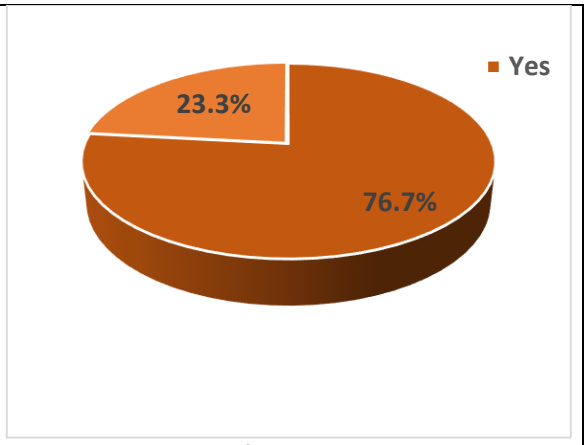

Figure 12. Provision of Waste Disposal Bins by Local Authorities

Figure 13 shows that all respondents (100%) identified cleanliness as the primary reason for waste disposal. A large majority (86.7%) cited concerns about unpleasant odours as a key motivating factor. Additionally, 83.3% of households indicated that the fear of illness significantly influenced their waste management practices. Furthermore, 80.0% of respondents emphasised the importance of proper and responsible waste disposal, reflecting a strong commitment to conscientious waste management behaviours.

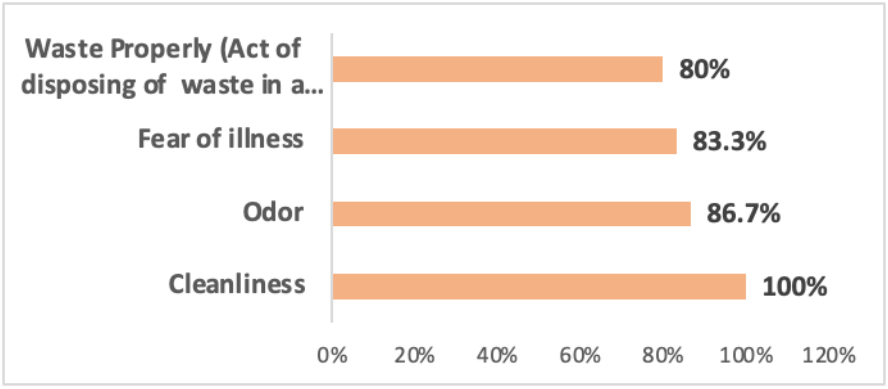

Figure 13. Reason of Dispose Waste by Respondents

4.1 Descriptive Test

Table 3 presents the descriptive analysis of respondents' solid waste disposal practices, revealing an overall mean score of 2.98. This suggests a moderate level of adherence to appropriate waste disposal behaviours among the surveyed households. On average, respondents demonstrate some engagement in proper waste management; however, there remains substantial scope for improvement in fostering more consistent and sustainable practices. Thaothuingam Malangmei and Koijam K.K. Mani Bhushan Singh (2023)

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emphasise the importance of household perspectives in managing solid waste, noting that when individuals understand the composition of their waste, they are more likely to adopt effective disposal methods, thereby contributing to a significant reduction in overall waste generation.

The recorded scores ranged from a minimum of 1.50 to a maximum of 4.40, indicating considerable variation in household disposal behaviours. Lower scores likely reflect households that infrequently practise responsible waste management, possibly due to limited awareness or indifferent attitudes. Conversely, higher scores suggest a consistent commitment to proper disposal practices, which may be attributed to increased environmental consciousness. Prativa Aryal and Prapti Adhikari (2025) found that the clear communication of information regarding waste segregation and disposal significantly improves household compliance with recommended practices.

This variation in responses highlights the heterogeneous nature of waste disposal behaviours across households and points to the need for targeted educational initiatives aimed at bridging the gap between low- and high-adherence groups. Encouraging more uniform and environmentally responsible practices is crucial. The existing literature consistently underscores the importance of enhancing public knowledge on solid waste managementnot only as a means of reducing environmental pollution but also as a foundational step towards achieving effective and sustainable waste management outcomes (Aiqin et al., 2020; A, 2020; G.K. Shankar & Kannan L., 2023).

Table 3. Descriptive Statistics for Solid Waste Disposal Practice

		Minimum	Maximum	Mean
1	I use to separate waste into different bins, likely for recycling, composting, and general waste.	1	5	3.47
2	I separate food waste from other types of waste.	1	5	3.47
3	I use food waste as compost for gardening.	1	5	3.00
4	I have intention to mix food waste with other solid waste.	1	5	2.67
5	I throw waste into drain.	1	5	1.50
6	I dispose solid waste (e.g: organic waste, recyclable materials, non-recyclable waste, hazardous waste and bulky waste) to waste collector.	1	5	3.43
7	I always dispose of different types of solid waste, such as recyclables, organic waste, and non-recyclable items.	1	5	3.50
8	I use to burn solid waste when I have bulk amount (refers to large items that do fit into regular trash bins, such as furniture, appliances, large household items, and large amounts of yard waste) of solid waste.	1	5	1.73
9	I keep all types of household waste in one trash bin.	1	5	3.57
10	I segregate bio-degradable (e.g. green waste, food waste, paper waste and biodegradable plastics) and non-biodegradable (e.g. bottle, glass, tin can, diapers, e.t.c) wastes.	1	5	3.03
11	I gather the waste in a plastic bag before disposing of it in the trash bin.	1	5	4.40

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12	I dispose waste by throwing it into an open field instead of using designated waste bins.	1	5	1.50
13	I separate solid wastes before disposal. (e.g. putting food waste and garden waste in one bin, recyclables like paper, plastic, and glass in another bin, and non-recyclable items in a separate bin for general waste.	1	5	3.43
	Average Solid Waste Disposal Practice			2.98

4.1.1 Knowledge of Solid Waste Disposal

Table 4 presents the descriptive analysis of respondents' knowledge regarding solid waste disposal, revealing an average mean score of 4.0. This indicates that, on average, respondents possess a relatively high level of knowledge concerning appropriate waste disposal practices. Such a score suggests that most individuals are well-informed about key aspects of solid waste management, including waste segregation, recycling, composting, and the environmental consequences of improper disposal (Thaothuingam Malangmei & Koijam K.K. Mani Bhushan Singh, 2023). The minimum recorded score was 3.37, indicating that even the least knowledgeable respondents have a moderate understanding of solid waste disposal. In contrast, the maximum score of 4.73 demonstrates that some respondents possess a very high level of knowledge, which may be attributed to formal education, professional exposure, or a strong personal commitment to environmental sustainability (Aiqin et al., 2020).

The relatively narrow range between the minimum and maximum scores suggests a generally well-informed respondent group, with minimal disparity in knowledge levels. This is a positive indication, as previous studies have highlighted the crucial role of knowledge in fostering environmentally responsible behaviour. Households with greater awareness are more inclined to adopt sustainable waste disposal practices and contribute to community hygiene and environmental conservation (Prativa Aryal & Prapti Adhikari, 2025). These findings reinforce the importance of maintaining and expanding public awareness initiatives to sustain and further enhance household knowledge. As noted by G.K. Shankar and Kannan L. (2023), cultivating a well-informed public is fundamental to the success of effective and sustainable solid waste management systems.

Table 4. Descriptive Statistics for Knowledge on Solid Waste Disposal

		Minimum	Maximum	Mean
1	I have knowledge of proper solid waste disposal practices.	2	5	3.87
2	I have knowledge how to separate recyclables item.	1	5	4.03
3	I have knowledge how to compose organic waste.	1	5	3.47
4	I have knowledge how to disposing of non-recyclables in designated bins.	1	5	3.37
5	I am well-informed about the proper methods of waste disposal.	1	5	3.63
6	I am well-informed that Solid wastes can be reduced, reused and recycled.	1	5	3.93
7	I am well-informed that solid wastes can be categorised as recyclable, biodegradable or non-biodegradable.	1	5	3.90

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8	I determine the appropriate method of disposal or recycling based on the source and type of waste.	2	5	3.70
9	I believe that littering waste in public places should be punishable by a fine.	3	5	4.73
10	I understand that open burning of solid waste is considered a violation of the law.	2	5	4.57
11	I know the schedule of waste collection in my area.	1	5	3.53
12	I understand the environmental consequences of improper waste disposal.	3	5	4.67
13	I am aware of the health risks associated with improper waste disposal.	2	5	4.60
	Average Knowledge on Solid Waste Disposal			4.0

Table 5 presents the descriptive analysis of respondents' attitudes towards solid waste disposal practices, with an overall average mean score of 4.18. This indicates that, in general, respondents exhibit positive attitudes towards proper waste disposal, reflecting a widespread recognition of its importance for environmental sustainability and public health. Khoo et al. (2022) emphasise that when households acknowledge their role in waste management, they are more likely to engage in sustainable behaviours, underscoring the role of personal accountability in promoting responsible waste practices.

The minimum score of 2.83 suggests that a segment of respondents hold neutral or slightly negative attitudes towards solid waste management. This group may perceive waste disposal as a low priority or may not view it as a personal responsibility. Contributing factors may include limited awareness, motivation, or access to environmental education. Maldaye et al. (2022) argue that disparities in education significantly influence levels of awareness, which in turn shape household attitudes towards waste practices.

Table 5. Descriptive Statistics for Attitude Towards Solid Waste Disposal Practice

		Minimum	Maximum	Mean
1	I will help to promote the importance of solid waste separation.	3	5	4.73
2	Waste segregation should be done at home.	4	5	4.80
3	Proper solid waste disposal helps society and the environment by reducing pollution, saving resources, and improving public health.	4	5	4.97
4	Solid waste disposal is not my responsibility. I believe that waste management should be managed by others, such as local authorities, waste management companies, or government agencies, rather than individuals.	1	5	3.27
5	Proper waste management, such as separating recyclables, composting, and ensuring waste is disposed of correctly can take time.	1	5	4.13
6	Solid waste disposal is a waste of money, as it involves costs for collection, transportation, and disposal.	1	5	2.83
7	Everybody is responsible in solid waste disposal towards reducing the amount of solid waste generated and ensuring that materials are reused, recycled, or composted instead of being sent to landfills or incinerators.	3	5	4.57

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8	Piles of garbage can be reduced when I do solid waste disposal activities.	3	5	4.50
9	Solid waste disposal activities (e.g.: sorting waste, recycling, composting, proper disposal, and waste reduction) are complicated.	1	5	3.43
10	Every household should be responsible for proper collection and disposal of solid wastes.	3	5	4.60
11	I feel responsible for following the waste disposal guidelines set by local authorities.	3	5	4.40
12	The ease and practicality of waste collection and disposal infrastructure are major factors influencing my household's waste disposal methods.	3	5	4.47
13	Traditions, and practices passed down through generations within my household impact our decision to separate waste.	1	5	4.00
14	Everyone in my house actively considers the environmental impact of our waste disposal practices.	1	5	3.47
15	I believe that improved waste collection and disposal infrastructure such as more accessible bins for recycling, composting, and waste, would help me to improve my waste disposal habits.	3	5	4.57
	Average Attitude Towards Solid Waste Disposal Practice			4.18

In contrast, the maximum score of 4.97 reflects a strongly positive attitude among certain respondents. These individuals are likely to be more environmentally conscious and actively engaged in proper waste management. Hazheer et al. (2023) found that education and awareness related to solid waste recycling not only improve behavioural outcomes but also foster a sense of individual responsibility in reducing pollution and litter. Their findings suggest that as awareness increases, attitudes become more positive, ultimately contributing to a decrease in environmental waste accumulation. The broad range of scores underscores the diversity of attitudes across households and reinforces the need for sustained public engagement and targeted educational outreach. Strengthening positive attitudes, while addressing the underlying causes of indifference or resistance, is essential for ensuring long-term public participation in sustainable waste disposal practices. As Maldaye et al. (2022) highlight, addressing educational inequalities is pivotal to shaping public perception and is fundamental to the success of solid waste management initiatives.

Effective household waste disposal particularly through the separation of recyclables, organic waste, and non-recyclables is crucial for advancing sustainability, protecting public health, and safeguarding the environment. Numerous studies affirm that proper waste segregation reduces the burden on landfills, improves recycling efficiency, and facilitates environmentally friendly recovery processes (Adefris et al., 2023; Madhanra Kalyanasundaram et al., 2021; Ankur Rajpal et al., 2020). However, improper disposal remains a persistent issue, contributing to environmental degradation and posing health hazards, as noted by Raphela et al. (2024) and Mohamed et al. (2023). Despite general awareness of these risks (Rossi et al. 2023; Maldaye et al., 2022), a significant gap persists between knowledge and practicelargely attributed to inadequate infrastructure, limited public education, and weak policy enforcement (Muiruri et al., 2020; Omang et al., 2021). Bridging this gap requires

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more than awareness campaigns; it demands the establishment of robust institutional frameworks and accessible waste management systems.

5. Conclusion

This study provides actionable insights for local authorities, policymakers, and waste management agencies in Selangor by examining how knowledge, attitudes, and infrastructure influence household solid waste disposal practices. By identifying key behavioural barriers and systemic gaps, the findings can inform the development of targeted educational initiatives and community-based interventions to promote sustainable disposal behaviours. These insights support the design of effective public outreach strategies, particularly in promoting segregation, recycling, composting, and waste minimisation. Furthermore, understanding household attitudes enables the implementation of participatory and incentive-based models to enhance community engagement. By actively involving households, it fosters a sense of shared responsibility and offers a replicable framework for collaborative waste management. Ultimately, the study provides a comprehensive understanding of the interplay between knowledge, attitudes, and structural factors laying the foundation for more effective and sustainable solid waste management practices in Selangor and other regions facing similar challenges.

The study concludes that households in Selangor exhibit a generally strong foundation of knowledge and positive attitudes toward solid waste disposal, yet these strengths are not fully reflected in their actual practices. The moderate average score for disposal behaviours indicates that while awareness exists, systemic and behavioural barriers hinder consistent and sustainable waste management. To bridge the knowledge–practice gap, policy efforts must move beyond information dissemination. There is a clear need for improved access to disposal infrastructure (e.g., waste bins and collection services), incentive-based or regulatory mechanisms, targeted educational programmes for demographic groups with lower engagement, and community-based environmental stewardship initiatives. Furthermore, tailored outreach should focus on instilling a greater sense of personal responsibility, especially among those who perceive waste management as external to their role. Reinforcing the direct consequences of improper disposal both environmentally and legally can also strengthen individual accountability.

Finally, although the sample size in this study was limited to 30 households due to time and access constraints, the findings provide a useful snapshot of current household waste management trends in Selangor. Future research should aim to use a larger and more diverse sample to enhance generalisability, and to explore more deeply the psychological and environmental factors that mediate the transition from awareness to practice.

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