

Household Consumers' Behaviour: Factors Influencing Food Waste Generation in Malaysia

Journal of Tourism, Hospitality & Culinary Arts (JTHCA)
2025, Vol. 7 (2) pp 105-123
© The Author(s) 2025
Reprints and permission:
UiTM Press
Submit date: 20st August 2025
Accept date: 15th September 2025
Publish date: 30th September 2025

Nur Saidatul Filzah Abdul Aziz

NakNak Prima Avenue, Cyberjaya, Malaysia
filzahezah@gmail.com

Nurul Aisyah Zaharuddin

Big Apple Pengkalan Ipoh, Malaysia
nurulaisyah9@gmail.com

Sulaiha Mohd Isa*

Faculty of Hotel and Tourism Management,
UiTM Cawangan Terengganu, Malaysia
sulai595@uitm.edu.my

Siti Khuzaimah A. Bakar

Faculty of Hotel and Tourism Management,
UiTM Cawangan Terengganu, Malaysia
ctab691@uitm.edu.my

Noraida Abdul Karim

Faculty of Hotel and Tourism Management,
UiTM Cawangan Terengganu, Malaysia
norai297@uitm.edu.my

Proposed citation:

Aziz, N. S. F. A., Zaharuddin, N. A., Isa, S. M., Bakar, S. K. A., & Karim, N. A (2025). Household consumers' behaviour: factors influencing food waste generation in Malaysia. *Journal of Tourism, Hospitality & Culinary Arts*, 17(2), 105-123.

Abstract

Food waste has become a pressing global concern with social, economic, and environmental implications. In Malaysia, households are among the largest contributors to food waste; yet, the behavioural factors driving this issue remain underexplored. Guided by the Theory of Planned Behaviour, this study examines the influence of diet preferences, purchasing discipline, and family stage and lifestyle on household food waste generation. Data were collected through a structured survey of Malaysian households ($n = 348$) and analysed using SmartPLS 4. The measurement model indicated acceptable reliability (Composite Reliability = 0.752–0.809) but low convergent validity (Average Variance Extracted = 0.299–0.310), reflecting the complexity of measuring culturally embedded food practices in Malaysia. All items were retained to preserve content validity. Structural model analysis revealed that two (2) predictors were

positively associated with food waste. Diet Preferences ($\beta = 0.174$, $f^2 = 0.026$) had small effects, while Family Stage and Lifestyle ($\beta = 0.420$, $f^2 = 0.192$) emerged as the strongest predictor with a medium effect size. The predictors explained 36.3% of the variance in household food waste generation ($R^2 = 0.363$), reflecting moderate explanatory power. These findings highlight that family composition and lifestyle patterns are central to household food waste in Malaysia. Policy interventions should therefore prioritise family- and lifestyle-focused education, complemented by initiatives promoting better purchasing habits and meal planning. Such strategies can help reduce waste while aligning with local cultural norms and daily practices.

Keywords:

Household consumer, food waste behaviour, diet preferences, purchasing discipline, family stage and lifestyle, Malaysia

1 Introduction

Food waste is broadly understood as edible food intended for human consumption that is ultimately discarded due to spoilage, expiration, or mismanagement along the supply chain (Giordano & Franco, 2021). Such waste often arises from inadequate storage, consumer behaviours, or systemic inefficiencies, highlighting both household and supply chain-level drivers (Cakar et al., 2020). Beyond spoilage, food waste may also result from market oversupply and consumer shopping or eating habits. The study by Heikal Ismail et al. (2020) highlighted that food waste, arising from prepared meals and leftovers, represents a significant sustainability challenge, particularly as population growth places further pressure on resources.

The escalating scale of food waste poses serious societal challenges. Environmentally, it contributes to greenhouse gas emissions and air pollution (Coudard et al., 2024). Health-wise, it exposes individuals to toxic gases that can cause respiratory issues, neurological damage, and even cancer (Rudziak et al., 2024); in terms of land use, it reduces available agricultural land while worsening nitrogen-related degradation and biodiversity loss (Guo et al., 2023). Food waste occurs at multiple stages of the supply chain, including agriculture, processing and manufacturing, retail, and consumption, which illustrates inefficiencies from production to end use (Cakar et al., 2020). Globally, households account for about 60% of total food waste, or roughly one-fifth of all food available to consumers, underscoring the importance of consumer behaviour in shaping waste generation (European Commission, 2024).

In Malaysia, COVID-19 altered food consumption and waste dynamics. The first COVID-19 case was detected on January 25, 2020, and rising cases prompted the government to enforce the Movement Control Order (MCO). During the stay-at-home restrictions of the MCO, households exhibited shifts in consumption patterns, where stockpiling practices contributed to a greater potential for food waste (Heikal Ismail et al., 2020). Although Jribi et al. (2020) reported reduced consumption during the pandemic, later studies suggest household food waste is increasingly driven by behaviours such as poor meal planning, misjudging edibility, and ineffective leftover management (Etim et al., 2024; Filimon et al., 2021; Vittuari et al., 2023).

Recent reviews highlight that household food waste is shaped by multiple behavioural determinants, including attitudes, perceived control, habits, identity, and situational cues like storage constraints and time pressure. Meta-syntheses (2023–2024) consistently identify attitudes, subjective norms, and perceived behavioural control as core drivers, while poor leftover management remains a persistent weakness (Aloysius et al., 2023; Etim et al., 2024). Identity-based motives, such as the “good-provider” norm, also drive over-purchasing, indirectly elevating waste (Werkman et al., 2025). These insights align with Malaysian findings linking overbuying, inadequate planning, and low leftover reuse to household waste (Ariffin et al., 2023). Together, they motivate the present study’s focus on diet preferences, purchasing discipline, and family stage and lifestyle as behavioural determinants of food waste.

Although existing studies have provided valuable insights into structural, cultural, and systemic factors contributing to household food waste (Cakar et al., 2020), there remains a notable gap in understanding behavioural determinants that are immediate, modifiable, and context-specific to Malaysia. International reviews from 2023 and 2025 consistently highlight diet preferences, purchasing discipline, and family roles or lifestyle stages as central behavioural drivers of household food waste (Aloysius et al., 2023; Etim et al., 2024; Werkman et al., 2025). However, empirical research focusing on these determinants within Malaysia remains limited despite growing evidence that overbuying, inadequate meal planning, and poor leftover management are major contributors (Ariffin et al., 2023).

To address this gap, the present study applies the Theory of Planned Behaviour (Ajzen, 1991) as a guiding framework to examine household consumer behaviour. Specifically, the study sets out to achieve the following objectives:

- a) To investigate the influence of diet preferences on household food waste generation.
- b) To analyse the role of purchasing discipline in shaping food waste behaviour.
- c) To assess the effect of family stage and lifestyle on household food waste generation in Malaysia.

By focusing on these behavioural determinants, this research aims to generate actionable insights that can inform targeted interventions and educational strategies to reduce food waste at the household level in Malaysia.

2 Literature Review

2.1 Food Waste Generation: An Overview

Food waste has been broadly defined as food originally intended for human consumption that is ultimately discarded due to spoilage, expiration, or neglect (Adaryani et al., 2025). Globally, food waste remains one of the most pressing sustainability challenges, with households contributing around 60% of total waste, higher than the 50% figure reported in earlier estimates. This reveals that household

consumption now accounts for the largest share of domestic waste, in which food alone constitutes 30.6% of all discarded waste in Malaysia (Business Today, 2024).

Apart from the amount, food waste also affects the environment significantly. Food waste emits methane when decomposing, a greenhouse gas 25 times more potent than carbon dioxide when it comes to global warming. These emissions lead to global warming, and land, water, and energy used in food production are all wasted once food is wasted (Coudard et al., 2024). In addition, Rudziak et al. (2024) mention health threats through exposure to landfill gas; for example, respiratory illness, cardiovascular disease, and cancer.

The problem is particularly concerning in Malaysia, where food waste rises hand in hand with urbanisation and economic growth. Without an organised recycling or disposal system, a lot of the waste is burned or dumped in landfills, adding to additional environmental damage. The fact that food waste occurs at different segments of the food chain (from production and processing to retailing and final consumption) points to systemic inefficiencies that call for policy, institutional, and consumer-level concerted interventions (Cakar et al., 2020).

The implications are severe: environmentally, decomposing food releases methane, a greenhouse gas 25 times more potent than carbon dioxide (Coudard et al., 2024); from a health perspective, landfill gases expose households to risks of respiratory disease and cancer (Rudziak et al., 2024); socially, wasted resources in food production undermine national food security (Guo et al., 2023). These overlapping concerns highlight the urgency of addressing food waste through both systemic and behavioural lenses.

2.2 Household Food Waste: Drivers and Determinants

Household food waste has been attributed to a range of behavioural, cultural, and structural factors. Structural studies emphasise systemic inefficiencies, such as poor storage and packaging design, which undermine consumer intentions (Chan, 2022; Zheng, 2023). Cultural research highlights social practices, such as over-preparing food as a symbol of hospitality, which remain deeply embedded in households (Keegan & Breadsell, 2021; Werkman et al., 2025). While these factors are important, they tend to reflect long-term systemic issues that are less amenable to rapid change.

By contrast, behavioural determinants such as meal planning, leftover management, and grocery purchasing practices are more immediate, modifiable, and therefore critical for targeted interventions (Etim et al., 2024; Aloysius et al., 2023). Studies in Europe and Asia demonstrate that simple changes in household routines can significantly reduce waste. For example, Filimon et al. (2021) and Vittuari et al. (2023) found that improving meal planning and storage behaviours directly lowered wastage in urban households. Similarly, Vittuari et al. (2023) noted that even when consumers are aware of the harms of waste, their daily shopping and cooking habits often override intentions. These findings underscore the need to isolate behavioural predictors when analysing food waste.

2.2.1 Diet Preferences and Food Waste

Diet preferences influence the diversity and quantity of food prepared at home. Households that cater to varied or restrictive diets tend to over-purchase and over-prepare, increasing the likelihood of surplus and waste (Aloysius et al., 2025). In Malaysia, where family meals often consist of multiple dishes to accommodate preferences, this tendency is pronounced (Ariffin et al., 2023). Moreover, identity-based drivers, such as wanting to be a “good provider,” often encourage households to prepare more food than necessary (Werkman et al., 2025). Thus, diet preferences represent a behavioural domain where personal identity intersects with cultural expectations, making it highly relevant to waste outcomes.

2.2.2 Purchasing Discipline and Household Waste

Purchasing discipline refers to the ability to plan, budget, and resist impulsive shopping. Studies show that weak purchasing discipline results in overbuying, stockpiling, and ultimately spoilage (Filimon et al., 2021; Etim et al., 2024). In the Malaysian context, the COVID-19 Movement Control Order amplified this behaviour of stockpiling, as many households stockpiled items, leading to excessive wastage (Heikal Ismail et al., 2020). International research confirms that disciplined purchasing, such as checking storage before shopping or sticking to shopping lists, correlates with lower waste generation (Aloysius et al., 2023; Vittuari et al., 2023). Hence, purchasing discipline remains a core lever for behavioural change.

2.2.3 Family Stage, Lifestyle, and Food Waste

Family stage and lifestyle capture the dynamics of household size, caregiving roles, and daily routines. Larger households, or those with young children, tend to generate more leftovers due to portioning challenges and the tendency to prepare extra food “just in case” (Werkman et al., 2025). Etim et al. (2024) observed that life-stage differences, such as single households versus families with dependents, lead to distinct waste profiles. Malaysian studies also highlight that shared meals and collective dining norms amplify leftover generation (Ariffin et al., 2023). Lifestyle factors, such as frequent dining out or reliance on convenience food, further complicate consumption and leftover management (Filimon et al., 2021). Therefore, family stage and lifestyle provide a socially embedded lens for analysing waste behaviours.

2.3 Awareness, Education, and Behavioural Interventions

Public awareness campaigns and education initiatives are being encouraged on an expansive scale as actions to reduce food wastage. Szakos et al. (2021) in Hungary indicated that behaviour-change communications combined with measurement interventions resulted in measurable food wastage reductions. Similarly, Szakos et al. (2021) demonstrated that awareness campaigns on the green, social, and economic costs of wastefulness promoted sustainable household practices. These results emphasise that focused interventions have a concrete effect when they offer information in conjunction with practical approaches.

Although they work, awareness campaigns are not as effective in isolation. Consumers may be extremely aware of food waste harms but still waste food due to structural or contextual constraints. Time pressures, portion sizes, and packaging incompatibilities frequently undermine behavioural intentions (Chan, 2022). Zheng (2023) further emphasises that compromised package resealability, ambiguous labelling, and oversized portions are some of the causes of wastage regardless of consumer awareness levels.

The challenge, therefore, is how to design interventions that go beyond the delivery of knowledge and address the structural, cultural, and material determinants underpinning wasteful conduct. Novel evidence from the literature recommends that coupling behavioral nudges with system-level interventions, such as packaging redesign and portioning, has the greatest potential for sustainable effectiveness. Awareness is, therefore, a necessary but by itself inadequate prerequisite for effective waste minimisation.

2.4 Daily Routines and Social Practices

Food waste is deeply embedded in the routines of daily life. Shopping, storage, cooking, and consumption practices are all interconnected activities that influence waste outcomes. Social practice research in Australia highlights that even when households express concern about waste, competing life priorities and ingrained habits often sustain wasteful practices (Keegan & Breadsell, 2021). This perspective reframes waste not as a result of ignorance but as an outcome of routinised behaviours.

For example, emergency shopping excursions will lead to over-purchasing, whereas hectic cooking schedules encourage over-preparation (Soma et al., 2020). Likewise, busy households end up unable to manage leftovers efficiently, spoiling food that can be recycled otherwise (Aloysius et al., 2023; Clement et al., 2023). Recent reviews also confirm that such mundane behaviours combined with poor storage are among the strongest predictors of household wastage (Etim et al., 2024).

Social and cultural forces also shape waste practice. In some, generating abundant food becomes associated with hospitality and sustenance even at the cost of there being waste subsequently. Cultural expectations like these compounded with material habit help create systemic barriers towards reducing food waste. Interventions must therefore take account not only of individual decision but also the broader sociocultural practices into which waste behaviours are keyed.

2.5 Material and Structural Influences

Apart from individual behaviour, material and structural conditions play the most significant role in domestic food wastage. Lack of proper storage facilities, inadequate refrigeration, and transportation constraints often counteract consumer efforts toward controlling food appropriately. Benassai-Dalmai et al. (2025) found that the farther the distance of travel to African markets, the higher the risk of food spoilage for the

households. This finding illustrates how wastage can be brought about by infrastructural constraints beyond individual control.

Urban households, particularly, are subjected to particular restrictions. Martianto et al. (2024) explained that Indonesians who live in urban areas discard more consumable food than those in rural societies due to crowded living conditions, hectic lifestyles, and poor storage facilities. These structural limitations interact with daily habits to amplify the threat of spoilage and loss.

Packaging design also depicts how material conditions affect waste. Excessively large portions, inadequate resealability, and ambiguous date codes are repeatedly recognised as causes of home spoilage (Chan, 2023). Zheng (2023) emphasises that successful reduction of waste needs alignment of packaging forms with people's needs, and it implies that systematic redesign must accompany behavioural interventions to enhance its impact.

2.6 Theoretical Perspectives on Food Waste

Theory of Planned Behaviour (TPB) was applied widely in food waste research, providing a model to explain the locations of attitudes, subjective norms, and perceived behaviour control. Recent research expands on TPB by adding other constructs such as habits, identity, and food literacy (Adaryani et al., 2025; Etim et al., 2024). These add-ons acknowledge that household food waste stems not just from intentions but also from social norms and habitual routines.

Empirical research indicates that attitudes toward minimising waste, family pressures, and perceptions of control over storage and time utilisation are strong predictors of food waste. Habits overpower intentions by design, so while householders might intend to waste less, everyday behaviours undermine their intentions. Micro-behaviours such as portion planning, leftover reuse, and fridge practices are the most important determinants, as highlighted by recent systematic reviews and meta-analyses of food waste behaviour (Aloysius et al., 2023; Etim et al., 2024; Vittuari et al., 2023). These studies consistently identify diet preferences, purchasing discipline, and family or lifestyle factors as central drivers of household food waste.

In the meantime, identity-based motivations complicate matters. For instance, the "good-provider" identity can lead to households overbuying food "just in case", and waste ensues even when there are good intentions to reduce it (Werkman et al., 2025). Such findings imply that theoretical approaches must continue to evolve to explain the complicated interaction between intentions, habits, and food waste behaviours under cultural identities.

2.7 Malaysian Context

Domestic food waste is a growing concern in Malaysia, particularly in urban metropolitan areas such as Klang Valley. According to statistics, over-purchasing, inefficient meal planning, and inefficient leftover management are common triggers (Ariffin et al., 2023). Such practices are additionally exacerbated by inefficient waste

management infrastructure in Malaysia, where food waste primarily ends up being landfilled rather than recycled or reused.

The COVID-19 pandemic also rearranged Malaysian waste and consumption patterns. The MCO period saw households adopting hoarding behaviours and changes in shopping routines, which, in turn, heightened the risk of food spoilage and wastage (Heikal Ismail et al., 2020). While Jribi et al. (2020) reported reduced consumption during lockdown elsewhere in the world, domestic homes in Malaysia were mixed, with excessive buying being a major problem.

Cultural practices come into play too. Traditional values of family hospitality and care in most Malaysian homes motivate extensive meal preparation, even at the cost of creating leftovers. Along with a perception of ignorance regarding waste-management options, these habits lead to rising disposal levels. Addressing Malaysia's food-waste problem, therefore, requires a dual approach: structural reform of waste management infrastructures and household behaviour modifications through culturally sensitive interventions.

2.8 Conceptual Framework

While the literature highlights a wide range of structural, cultural, and material factors, this study focuses specifically on three behavioural determinants: diet preferences, purchasing discipline, and family stage/lifestyle. This focus reflects the Theory of Planned Behaviour (Ajzen, 1991), which emphasises that attitudes, perceived behavioural control, and subjective norms shape behavioural outcomes. Recent extensions of TPB also incorporate identity and food literacy, showing that household waste arises not only from intentions but also from ingrained routines and cultural roles (Adaryani et al., 2025; Etim et al., 2024).

Within this framework, the present study narrows its focus to three (3) behavioural determinants: diet preferences, purchasing discipline, and family stage/lifestyle. Diet preferences represent household attitudes toward food variety and identity-based expectations. Purchasing discipline reflects perceived control over planning, budgeting, and resisting impulsive buying. Family stage and lifestyle capture the social norms and routines that influence portioning, caregiving, and collective dining practices. These three (3) determinants provide an actionable and culturally relevant lens for explaining household food waste generation in Malaysia due to:

- a) **Immediacy and Modifiability:** These variables are directly observable in everyday routines such as cooking, shopping, and portioning, making them the most actionable points for intervention (Aloysius et al., 2023; Etim et al., 2024).
- b) **Cultural Relevance:** In Malaysia, food is closely tied to identity, family, and hospitality norms. Over-purchasing, diverse meal preparation, and collective dining habits mean that these three behavioural domains are especially influential (Ariffin et al., 2023).

- c) Empirical Support: International evidence (2023–2025) consistently highlights these factors as core predictors of household waste; yet their role remains underexplored in the Malaysian context (Werkman et al., 2025; Vittuari et al., 2023).

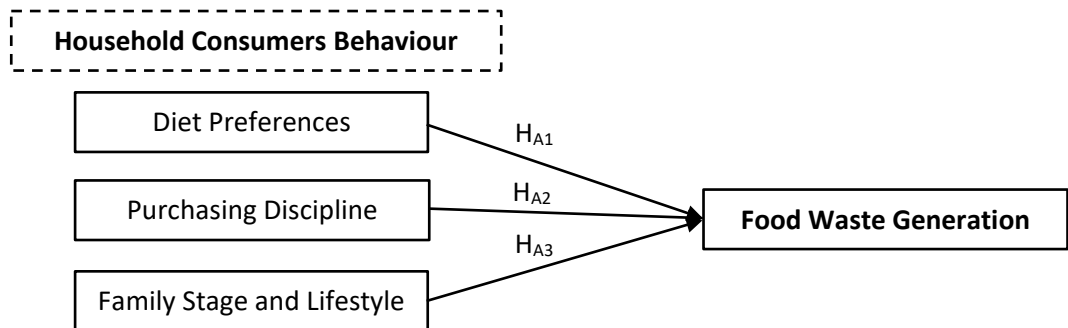


Figure 1: Conceptual research framework

Accordingly, the conceptual framework (Figure 1) hypothesises that:

- H_{A1}: Diet preferences positively influence household food waste generation.
- H_{A2}: Purchasing discipline positively influences household food waste generation.
- H_{A3}: Family stage and lifestyle positively influence household food waste generation.

Guided by the Theory of Planned Behaviour (Ajzen, 1991), the model posits those everyday routines, shopping habits, and family dynamics shape waste-related practices. Each behavioural determinant is hypothesised to have a positive influence on food waste generation (H1–H3), reflecting the notion that individual attitudes, perceived control, and identity-based norms translate into household consumption and disposal patterns (Etim et al., 2024; Werkman et al., 2025). By empirically testing these relationships, this study seeks to clarify the behavioural mechanisms driving domestic food waste in Malaysia, thereby informing interventions tailored to household practices and cultural norms.

3 Methodology

3.1 Research Design

This study employed a quantitative research design using a structured questionnaire as the primary data collection instrument. The survey was divided into sections covering demographic information, diet preferences (12 items), purchasing discipline (9 items), and family stage and lifestyle (11 items), as summarised in Table 1. All items were measured using a five-point Likert scale, allowing respondents to indicate the extent of their agreement with each statement. The design of the instrument was guided by prior literature on household food waste to ensure that the constructs reflected relevant behavioural dimensions.

Table 1: Independent variable items

Diet Preferences	Purchasing Discipline	Family Stage and Lifestyle
1. How often do you cook your own food?	1. Weekly shopping frequency.	1. In general, how often do all members of your household eat together?
2. Do you usually plan your meals in advance?	2. I am able to pay a greater amount for high-quality of meals.	2. My household eats together at home.
3. How many (out of the total meals cooked per week) are planned?	3. I always check my cupboards and fridge before buying groceries.	3. In my household, large variety of meals are served at mealtimes so everyone can have food they like.
4. Have you ever tried to diet?	4. I will take the initiative to limit my daily food purchases.	4. I serve the portions for my children.
5. Do you take in consideration recipes or any dietary plan when preparing your meals?	5. I can cook and prepare exactly the amount of food that my household needs.	5. My children serve their own portions of food.
6. I create menus for myself.	6. I always use the proper sizes when cooking meals.	6. In my household, we deliberately prepare more food than necessary to ensure they get enough food.
7. How often do you estimate the portions you will take on a meal (food in the plate)?	7. I aim to go shopping as little as possible.	7. In my household, we sometimes do not finish all meals that have cooked.
8. I try to eat in moderation.	8. To me, food products may pose a health risk if they are used after the “use by” date on the food labels.	8. In my household, we eat leftovers food as they are or reheat them.
9. When preparing food, I am careful to use all possible ingredients.	9. I take great care to reduce my spending on food.	9. In my household, we use leftover food in new dishes by adding other ingredients.
10. All the food prepared is eaten at my house.		10. In my household, we only cook meals that we know our children likes.
11. Throwing away food is inevitable when one takes care of their diet.		11. In my household, we make it a point to use up leftover meals or food close to expiring when cooking.
12. In my house, there is a waste from food, for example, leftover rice.		

Note. Items were primarily adapted from prior studies on household food waste and consumer behaviour (Filimon et al., 2021; Aloysius et al., 2023; Etim et al., 2024; Werkman et al., 2025). Several items were modified to reflect Malaysian cultural practices such as communal eating, dietary diversity, and leftover management. Additional items were newly developed based on household routines identified in preliminary interviews. All items were pre-tested with a pilot group (n = 30) to ensure clarity and cultural appropriateness before the main survey.

The dependent variable, household food waste generation, was measured separately using six (6) items adapted from established measures of food waste behaviour, as shown in Table 2.

Table 2: Dependent variable items

Household Food Waste Generation
1. In my household, we frequently throw away uneaten cooked food.
2. Leftover food is often discarded rather than reused.
3. We sometimes prepare more food than we can finish, which ends up being wasted.
4. Food close to expiry is often thrown away in my household.
5. It is common for us to dispose of perishable items (e.g., fruits, vegetables) before they are fully consumed.
6. Throwing away food in my household is unavoidable.

Note. Items were adapted from established measures of household food waste behaviour (Filimon et al., 2021; Vittuari et al., 2023; Etim et al., 2024). All items were measured on a five-point Likert scale (1 = Strongly disagree, 5 = Strongly agree), with higher scores indicating greater levels of household food waste generation.

The target population consisted of household consumers residing in Malaysia, as they represent the main contributors to domestic food waste. Data were collected using a convenience sampling approach, with the questionnaire distributed online via Google Forms. A total of 348 valid responses were obtained and retained for subsequent statistical analysis. The sample size was deemed adequate for quantitative research of this nature, providing sufficient representation to explore the relationships between the three (3) behavioural variables of interest (diet preferences, purchasing discipline, and family stage/lifestyle) in influencing household food waste generation.

3.2 Instrument Development

The questionnaire items for diet preferences, purchasing discipline, and family stage and lifestyle were developed based on a combination of established literature and context-specific modifications. Core items were adapted from validated scales in prior studies on household food waste and consumer behaviour (Filimon et al., 2021; Aloysius et al., 2023; Etim et al., 2024; Werkman et al., 2025). Several items were reworded to reflect Malaysian household practices, such as communal dining, dietary diversity in family meals, and leftover management. In addition, a small number of items were newly developed to capture unique aspects of the local context that were not addressed in previous instruments.

To ensure clarity and face validity, the questionnaire was reviewed by two academic experts in consumer behaviour and sustainable consumption. A pilot test was then conducted with 30 Malaysian household respondents. Feedback from the pilot highlighted minor issues in wording and response interpretation, which were subsequently refined. This process enhanced the cultural appropriateness and comprehensibility of the instrument prior to full-scale data collection.

3.3 Data Analysis

Data were analysed using SmartPLS 4.0, following the two-step PLS-SEM procedure recommended by Hair et al. (2022). First, the measurement model was assessed by examining indicator reliability, internal consistency reliability (composite reliability, CR), convergent validity (average variance extracted, AVE), and discriminant validity (heterotrait-monotrait ratio, HTMT) criterion. Items with loadings below 0.40 were retained after consideration of content validity and cultural relevance.

Second, the structural model was evaluated by assessing collinearity (variance inflation factor, VIF), explanatory power (R^2), effect sizes (f^2), and predictive relevance (Q^2). Path coefficients were estimated using a bootstrapping procedure with 5,000 resamples to test the significance of hypothesised relationships. The reporting follows current guidelines for PLS-SEM applications in behavioural and consumer research (Hair et al., 2022).

4 Findings

4.1 Residency Respondents

Most respondents were concentrated in the central region, particularly Selangor and Wilayah Persekutuan, which together accounted for more than three-quarters of the sample.

Table 3: Residency are

State	Percentage (%)	State	Percentage (%)
Johor	2.3	Kelantan	4.9
Melaka	0.5	Pahang	1.0
Negeri Sembilan	1.3	Terengganu	7.0
Kedah	0.8	Selangor	41.1
Perak	4.9	Wilayah Persekutuan	35.2
Pulau Pinang	0.8		

4.2 Measurement Model Results

Indicator reliability and construct validity were evaluated as illustrated in Table 4, presenting the results of the measurement model assessment. Composite reliabilities were acceptable (Diet Preferences CR = 0.797; Purchasing Discipline CR = 0.752; Family

Stage & Lifestyle CR = 0.809). However, average variance extracted (AVE) values were below the usual 0.50 benchmark (Diet Preferences α = 0.299; Purchasing Discipline = 0.310; Family Stage & Lifestyle = 0.301). This suggests that, on average, less than half of the variance in the indicators was explained by their respective latent constructs, reflecting limited convergent validity. The low AVE values were largely due to weak outer loadings across several indicators (ranges DP 0.051–0.682; PD 0.261–0.775; FSL 0.381–0.763). Despite these limitations, all items were retained to preserve content validity and ensure that culturally specific aspects of Malaysian household food practices (namely dietary diversity, impulse purchasing, and family dining routines) were captured. This decision reflects a trade-off between statistical convergence and contextual completeness. Therefore, the result ranges reported in Table 4 reflect the full set of items used in the analysis, with no indicators removed.

Table 4: Validity and reliability results

Constructs	Items	Loadings	AVE	CR
Diet Preferences (DP)	12	0.051-0.682	0.299	0.797
Purchasing Discipline (PD)	9	0.261-0.775	0.310	0.752
Family stage and lifestyle (FSL)	11	0.381-0.763	0.301	0.809

Note: Composite reliability (CR) values exceed 0.70, indicating adequate internal consistency. AVE values below 0.50 reflect limited convergent validity due to low indicator loadings, but all items were retained to preserve cultural and contextual relevance.

Further validity checks showed that discriminant validity was established, with all heterotrait–monotrait ratio of correlations (HTMT) values below the conservative threshold of 0.85. In addition, variance inflation factor (VIF) values were below 3.0, indicating no multicollinearity concerns among constructs.

4.3 Structural Model Results

The structural model was tested using SmartPLS 4.0 with 5,000 bootstrap subsamples. Collinearity checks confirmed acceptable VIF values (< 3.0). The three behavioural determinants explained 36.3% of the variance in household food waste generation ($R^2 = 0.363$), reflecting moderate explanatory power. Effect sizes (f^2) were also examined to assess the relative contribution of each predictor. Table 5 below presents the results of the structural model. Together, the three (3) behavioural determinants explained 36.3% of the variance in household food waste generation ($R^2 = 0.363$), which represents a moderate level of explanatory power in the context of social science research.

Table 5: Structural model result

Hypothesis	Relationship	Beta value	SE	t-value	Decision	f^2	R^2
H _{A1}	DP→FWG	0.174	.019	3.441	Supported	0.026	0.363
H _{A2}	PD→FWG	0.116	.024	1.100	Not supported	0.014	
H _{A3}	FSL→FWG	0.420	.017	6.670	Supported	0.192	

Note: DP: Diet Preferences; PD: Purchasing Discipline; FSL: Family Stage and Lifestyle; SE: Std Error

Only two (2) predictors exhibited statistically significant positive relationships with household food waste generation. Diet Preferences ($\beta = 0.174$, $p < 0.05$) were significant but relatively weak predictors, with effect sizes (f^2) of 0.026, indicating small practical contributions. Family Stage and Lifestyle ($\beta = 0.420$, $p < 0.001$) emerged as the strongest predictor, with a medium effect size ($f^2 = 0.192$), highlighting the central role of household composition, caregiving responsibilities, and daily routines in influencing food waste. By contrast, Purchasing Discipline showed a positive but non-significant relationship with household food waste generation ($\beta = 0.132$, $t = 1.100$, $p > 0.05$). This suggests that while purchasing discipline may contribute to waste behaviour, its effect was weak and statistically inconclusive in this study.

Overall, the findings indicate that although dietary practices and shopping habits matter, family stage and lifestyle factors are the most influential drivers of food waste in Malaysian households, reflecting cultural norms of communal dining, portioning practices, and caregiving dynamics.

5 Discussion

The findings extend prior research on household food waste by demonstrating the varying influence of behavioural determinants within the Malaysian context. Consistent with earlier studies, purchasing-related behaviours and diet preferences were positively associated with waste generation, though their effects were modest (Filimon et al., 2021; Aloysius et al., 2023; Vittuari et al., 2023). This suggests that while impulsive shopping and diverse food choices contribute to waste, they do not fully account for the complexity of household practices. The strongest predictor was family stage and lifestyle, aligning with Werkman et al. (2025) and Etim et al. (2024), who found that household size, caregiving responsibilities, and collective dining routines significantly shape waste behaviours. In Malaysia, where food abundance is often linked to cultural norms of hospitality and family togetherness (Ariffin et al., 2023), this relationship appears particularly pronounced.

At the same time, the measurement model results indicate limitations. Although composite reliabilities were acceptable, the low AVE values highlight restricted convergent validity, reflecting the challenge of capturing complex, culturally embedded household practices with a limited set of indicators. Retaining weakly loading items ensured that relevant cultural dimensions were not omitted, but this decision also implies that small effect sizes should be interpreted with caution. Taken together, these findings underscore that while diet preferences and purchasing discipline are important, family structure and lifestyle remain the most powerful levers for interventions aimed at reducing household food waste in Malaysia.

6 Practical Implications

The study's findings offer several implications for efforts to reduce household food waste in Malaysia. First, the strong effect of family stage and lifestyle suggests that

interventions should be tailored to household composition. For example, awareness campaigns could target families with young children, who are more prone to over-preparing food, with guidance on portion control and leftover management (Etim et al., 2024; Werkman et al., 2025). Similarly, households with elderly dependents or larger family units may benefit from practical tips on storage, meal planning, and sharing surplus food within communities (Filimon et al., 2021).

Second, although diet preferences and purchasing discipline showed smaller effects, they remain relevant for behaviour-change initiatives. Public campaigns could emphasise the financial and environmental costs of impulsive purchasing and promote strategies such as shopping lists, checking household stocks before shopping, and buying in smaller quantities (Aloysius et al., 2023; Vittuari et al., 2023). For diet diversity, messages could focus on preparing culturally diverse meals in smaller portions or repurposing leftovers creatively, rather than eliminating variety (Ariffin et al., 2023).

Third, the results underscore the importance of embedding cultural context in waste-reduction strategies. In Malaysia, where abundant meals are associated with generosity and family cohesion, policy interventions should be sensitive to these norms. Instead of framing food waste reduction as sacrifice, messaging could highlight values of resourcefulness and care — for example, portraying portion management as an expression of love and responsibility toward family and the environment (Werkman et al., 2025; Chan, 2022).

Finally, the moderate explanatory power of the model ($R^2 = 0.363$) indicates that other factors such as food literacy, packaging design, and infrastructure for surplus redistribution also require attention (Benassai-Dalmau et al., 2025; Martianto et al., 2024). Consequently, it will be essential for policymakers, NGOs, retailers, and households to work together to address both behavioural and structural aspects of food waste (Szakos et al., 2021).

7 Conclusion

This study confirms that diet preferences, purchasing discipline, and family stage and lifestyle are significant behavioural predictors of household food waste in Malaysia, together explaining 36.3% of the variance. Among these, family stage and lifestyle exerted the strongest effect, highlighting the importance of household routines and caregiving roles in shaping waste practices.

The findings are consistent with prior research that emphasises behavioural drivers of food waste, such as poor planning, storage, and purchasing habits (Filimon et al., 2021; Etim et al., 2024), and they reinforce the Theory of Planned Behaviour as a useful framework for understanding these dynamics (Etim et al., 2024; Adaryani et al., 2025). At the same time, the results diverge from studies in Europe and Australia that stress structural or cultural influences like packaging design and hospitality norms (Chan, 2023; Keegan & Breadsell, 2021). This suggests that in Malaysia, household behaviours are the most immediate and actionable determinants, making behavioural interventions—such

as meal planning, leftover reuse, and family-stage-sensitive strategies—key to reducing domestic food waste.

8 About the authors

Nur Saidatul Filzah Abdul Aziz holds a Bachelor of Science (Hons.) degree in Foodservice Management (HM242) from the Faculty of Hotel and Tourism Management at Universiti Teknologi MARA (UiTM) Cawangan Terengganu. Her academic interests focus on various aspects of the foodservice management. This paper represents her first academic publication, completed as part of her undergraduate research project. She is currently employed in the Food and Beverage industry at NakNak Prima Avenue, Cyberjaya.

Nurul Aisyah Zaharuddin has completed her Bachelor of Science (Hons.) in Foodservice Management (HM242) from the Faculty of Hotel and Tourism Management at Universiti Teknologi MARA (UiTM) Cawangan Terengganu. Her academic interests focus on various aspects of the foodservice management. This paper represents her first academic publication, completed as part of her undergraduate research project. She is currently a science trainer at Big Apple, Pengkalan Ipoh.

Sulaiha Mohd Isa is a lecturer at the Faculty of Hotel and Tourism Management, Universiti Teknologi MARA (UiTM) Cawangan Terengganu. She has a Master of Science Tourism Management (M.Sc.) from Universiti Teknologi MARA. Her research interests are in tourism management, sustainability, operations in hospitality, guest satisfaction, event management, and has co-published many publications. She has been actively involved in many conferences and workshops in hospitality and tourism.

Siti Khuzaimah A. Bakar is a senior lecturer at the Faculty of Hotel and Tourism Management, Universiti Teknologi MARA (UiTM) Puncak Alam. She holds a Master in Gastronomy, Universiti Teknologi MARA. Her research interests focus on culinary practices, hospitality management, and cooking routines among working women in Malaysia, and she has co-authored numerous publications. She actively participates in conferences and workshops related to hospitality, tourism, and culinary education.

Noraida Abdul Karim is a senior lecturer at the Faculty of Hotel and Tourism Management, UiTM Cawangan Terengganu, Malaysia. She is a Ministry of Health's Food Handler Training programme certified trainer. She co-authored over 22 journal articles and proceeding papers on many gastronomy and hospitality educational topics. The research interest now encompasses the various topics on food-hygiene sanitation, food product development, gastronomy heritage and tourism hospitality management.

9 References

Adaryani, R. L., Palouj, M., Gholami, H., Baghestany, A. A., Damirchi, M. J., Dadar, M., & Seifollahi, N. (2025). Predicting household food waste behavior: Bringing Food Literacy and purchasing power into the theory of planned behavior. *Journal of Retailing and Consumer Services*, 82, 104119. <https://doi.org/10.1016/j.jretconser.2024.104119>

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Aloysius, N., Ananda, J., Mitsis, A., & Pearson, D. (2023). Why people are bad at leftover food management? A systematic literature review and a framework to analyze household leftover food waste generation behavior. *Appetite*, 186, 106577. <https://doi.org/10.1016/j.appet.2023.106577>
- Aloysius, N., Ananda, J., Mitsis, A., & Pearson, D. (2025). The last bite: Exploring behavioural and situational factors influencing leftover food waste in households. *Food Quality and Preference*, 123, 105327. <https://doi.org/10.1016/j.foodqual.2024.105327>
- Ariffin, Z. Z., Anuar, S. N., Mangadi, N. F., Yaakop, A. Y., Sakawi, Z., Jusoh, S., & Ibrahim, M. A. (2023). Household Food Waste Behavior in Klang Valley, Malaysia, and Its Potential in the Circular Economy. *Sustainability*, 15(12), 9431. <https://doi.org/10.3390/su15129431>
- Benassai-Dalmau, R., Voukelatou, V., Schifanella, R., Fiandrino, S., Paolotti, D., & Kalimeri, K. (2025). Unequal journeys to Food Markets: Continental-scale evidence from Open Data in Africa. *arXiv.org*. <http://arxiv.org/pdf/2505.07913>
- Business Today. (2024). Paving the way to a zero food waste Malaysia. *Business Today*. <https://www.businesstoday.com.my/2024/04/09/paving-the-way-to-a-zero-food-waste-malaysia/>
- Cakar, B., Aydin, S., Varank, G., & Ozcan, H. K. (2020). Assessment of environmental impact of FOOD waste in Turkey. *Journal of Cleaner Production*, 244, 118846. <https://doi.org/10.1016/j.jclepro.2019.118846>
- Chan, R. B. Y. (2022). A review of packaging-related studies in the context of household food waste: Drivers, solutions and avenues for future research. *Packaging Technology and Science*, 35(3), e2611. <https://doi.org/10.1002/pts.2611>
- Clement, J., Alenčikienė, G., Riipi, I., Starkutė, U., Čepytė, K., Buraitytė, A., Zabulionė, A., & Šalaševičienė, A. (2023). Exploring causes and potential solutions for food waste among young consumers. *Foods*, 12(13), 2570. <https://doi.org/10.3390/foods12132570>
- Coudard, A., Sun, Z., Behrens, P. & Mogollón, J. M., (2024). The global environmental benefits of halving avoidable consumer food waste. *Environmental Science & Technology*, 58(31), 13707–13716. <https://doi.org/10.1021/acs.est.4c04140>
- Etim, E., Choedron, K. T., Ajai, O., Duke, O. & Jijingi, H. E. (2024). Systematic review of factors influencing household food waste behaviour: Applying the theory of planned behaviour. *Waste Management & Research*. 43(6):803-827. doi:10.1177/0734242X241285423
- European Commission. (2024). Think eat save: Tracking progress to halve global food waste. *Food waste index report 2024*. https://knowledge4policy.ec.europa.eu/publication/food-waste-index-report-2024-think-eat-save-tracking-progress-halve-global-food-waste_en
- Giordano, C., & Franco, S. (2021). Household Food Waste from an International Perspective. *Sustainability*, 13(9), 5122. <https://doi.org/10.3390/su13095122>
- Guo, Y., Tan, H., Zhang, L., Liu, G., Zhou, M., Vira, J., Hess, P. G., Liu, X., Paulot, F., & Liu, X. (2023). Global food loss and waste embodies unrecognized harms to air quality and biodiversity hotspots. *Nature food*, 4(8), 686–698. <https://doi.org/10.1038/s43016-023-00810-0>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A primer on partial least squares structural equation modeling (PLS-SEM) (3rd ed.). SAGE Publications.
- Ismail, M. H., Ghazi, T. I. M., Hamzah, M. H., Manaf, L. A., Tahir, R. M., Mohd Nasir, A., & Ehsan Omar, A. (2020). Impact of Movement Control Order (MCO) due to Coronavirus Disease (COVID-19) on Food Waste Generation: A Case Study in Klang Valley, Malaysia. *Sustainability*, 12(21), 8848. <https://doi.org/10.3390/su12218848>

- Jribi, S., Ismail, H. B., Doggui, D., & Debbabi, H. (2020). COVID-19 virus outbreak lockdown: What impacts on household food wastage? *Environment, Development and Sustainability*, 22, 3939–3955. <https://doi.org/10.1007/s10668-020-00740-y>
- Keegan, E., & Breadsell, J. K. (2021). Food Waste and Social Practices in Australian Households. *Sustainability*, 13(6), 3377. <https://doi.org/10.3390/su13063377>
- Martianto, D., Diana, R., Baliwati, Y. F., Sukandar, D., & Hendriadi, A. (2024). The quantity and composition of household food waste: Implications for policy. *PLOS ONE*, 19(6), e0305087. <https://doi.org/10.1371/journal.pone.0305087>
- Rudziak, P., Batung, E., & Luginaah, I. (2024). The effects of gases from food waste on human health: A systematic review. *PLOS ONE*, 19(3), e0300801. <https://doi.org/10.1371/journal.pone.0300801>
- Soma, T., Li, B., Maclaren, V., & Setyowati, D. (2020). Food waste reduction: A test of three consumer interventions. *Sustainability*, 12(3), 907. <https://doi.org/10.3390/su12030907>
- Szakos, D., Szabó-Bódi, B., & Kasza, G. (2021). Consumer awareness campaign to reduce household food waste based on structural equation behavior modeling in Hungary. *Environmental Science and Pollution Research*, 28(19), 24580–24589. <https://doi.org/10.1007/s11356-020-09047-x>
- Vittuari, M., Garcia Herrero, L., Masotti, M., Iori, E., Caldeira, C., Qian, Z., Bruns, H., van Herpen, E., Obersteiner, G., Kaptan, G., Liu, G., Mikkelsen, B. E., Swannell, R., Kasza, G., Nohlen, H., & Sala, S. (2023). How to reduce consumer food waste at household level: A literature review on drivers and levers for behavioural change. *Sustainable Production and Consumption*, 38, 104–114. <https://doi.org/10.1016/j.spc.2023.03.023>
- Werkman, A., van Doorn, J., van Ittersum, K., & Kok, A. (2025). No waste like home: How the good provider identity drives excessive purchasing and household food waste. *Journal of Environmental Psychology*, 103, 102564. <https://doi.org/10.1016/j.jenvp.2025.102564>
- Zheng, S. S. (2023). Misconceptions of food packaging aggravates food waste problem. RMIT University. <https://www.rmit.edu.au/news/all-news/2023/may/food-waste?>