Exploring knowledge, attitudes and practices of urban community on herbal plant cultivation in Klang valley, Malaysia

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Abstract

Herbal plant cultivation in urban areas contributes significantly to sustainable living and community well-being. This study examines the engagement of metropolitan residents in the Klang Valley, Malaysia, in herbal planting activities using the Knowledge, Attitude, and Practice (KAP) model. A quantitative survey was conducted across seven districts, yielding 393 respondents. Data were analyzed using descriptive statistics, Spearman correlation, the Mann-Whitney U test, and the Kruskal-Wallis H test. Results revealed that 36.6% of respondents had a moderate level of knowledge about herbal plants. A notable 43% strongly agreed that herbal cultivation promotes health, and 35.9% preferred planting on vacant land. A strong correlation was found between attitude and practice, particularly in activities such as planting in pots, using vacant land, regular watering, and fertilization. The attitude-practice link was stronger than the knowledge–practice connection. Statistically significant differences (P < .05) were observed in knowledge, attitudes, and practices across various demographic factors, including gender, age, ethnicity, residence type, and education level. Overall, while knowledge levels were basic, the community showed moderate awareness and engagement in herbal planting practices. The study emphasizes the importance of targeted awareness campaigns and educational initiatives to enhance urban community understanding and participation in herbal cultivation.

Keywords: Knowledge, Attitude, Practice, Cultivate herb plants, Urban community

1.Introduction

Throughout history, diverse civilisations have recognised the value of traditional medical systems, including the use of plants for healing. In Malaysia, traditional Malay medicine, influenced by cultural exchanges over time, has long incorporated the therapeutic properties of the local flora (Mohd Noor, 2017). Today, there is a resurgence of interest in herbal remedies, driven by perceptions of their gentler effects compared to synthetic drugs and their increasing use across various industries (Manaf et al., 2000; Jabatan Pertanian Malaysia, 2020). Medical practitioners are recognised as key agents in educating the public about the benefits of herbal medicine and its positive impact on community health; however, the potential of home gardens as accessible "living pharmacies" remains unexplored (Rahayu et al., 2020).

Despite government initiatives to promote the herbal industry in Malaysia, the nation lags behind other countries due to market factors and limited corporate support (Kamarulzaman & Talib, 2015). This is compounded by reliance on imported raw materials from countries such as China, Indonesia, and Thailand, which may discourage local cultivation of herbal plants in residential areas. While the broader context of herbal medicine is evident, understanding the specific knowledge, attitudes, and practices surrounding herbal plants within local communities is crucial. The rise of urban gardening across many regions suggests growing interest in cultivating herbs at home (Trendov, 2018). In the context of the Klang Valley, encouraging domestic cultivation of herbal species requires a deeper understanding of residents' current knowledge, attitudes, and practices regarding herbal cultivation. This gap highlights the need for empirical investigation to support community-level engagement in herbal planting initiatives.

1.1 Herbal plants

Ethnobotany, an interdisciplinary field of study, examines the traditional knowledge and practices of various communities regarding plants and their

diverse applications. A foundational aspect of ethnobotanical research is the characteristics of herbal plants, including their physical form, chemical composition, factors that influence their selection, and their application within communities (Walujo, 2011). Gapor and Echoh (2013) categorise the uses of herbal plants as i) culinary, ii) medicinal, and iii) for fresh consumption. Examples of herbs used in cooking include turmeric, ginger, lemongrass, pandan, and galangal. Herbs that can be eaten fresh include *Cekur, Pegaga, Betel, Selom, Ulam Raja*, Basil, Thyme, and Mint. Furthermore, medicinal herbs such as Batang Wali/Akar Seruntun are used to help lower high blood pressure and treat scalp conditions, such as dryness and dandruff.

Herbs and medicinal plants can treat various ailments through their bioactive compounds, which possess diverse therapeutic properties. Examples of therapeutic effects are anti-inflammatory, antiviral, antitumor, antimalarial, and analgesic properties (Aye et al., 2019). The antimicrobial properties of medicinal plants benefit wound healing. Plants not only offer numerous benefits but also add aesthetic value to landscape design. Herbal plants are often used as side plants in the home area as an alternative to treating diseases. Malay garden landscapes can be divided into three parts: the front, side, and back. Every part of the landscape reflects its function and role within the Malay community's culture. The front area usually serves as a multi-purpose space for community activities.

Therefore, ornamental plants that are flowering, fragrant, and purposefully small give a comfortable atmosphere. A tree that does not flower like a tongue, alligators can also be placed in the front area. This plant species is beneficial for treating wounds, reducing fever, and as a cosmetic aid. For the side area, large-sized plant are suggested that can give shade to cover the personal room, such as fruit trees and also herb plants that are used for medicinal purposes, such as Jerangau (*Acorus calamus L.*), Aloe vera (*Aloe vera L.*), galangal (*Alphinia galangal L. Willd*), Pinang (*Areca Catechu*), Ulam Raja (*Cosmos Caudatus*), Turmeric (*Curcuma Domestica Valeton*), Bakawali (*Epiphyllum anguliger*), Kantan (*Etlingera elatior*), Asam Gelugur (*Garcinia atroviridis*), Lemongrass (*Syzygiumpolyanthum*), Asam Jawa (*Tamarindus indica*), Ginger (*Zingiber officinale*), and Lempoyang (*Zingiber zerumbet).* Ultimately, the back

area of the house is typically cultivated for culinary purposes (Hamzah & Ibrahim, 2019).

1.2 Theoretical framework: The Knowledge, Attitude, and Practice (KAP) model

The Knowledge, Attitude, and Practice (KAP) model is a widely used framework in social and behavioural sciences to understand and explain health-related behaviours and other practices within a population. It suggests that an individual's behaviour (Practice) is influenced by what they know (Knowledge) and how they feel about it (Attitude). Understanding these three components can provide valuable insights into why people behave in specific ways and inform the development of interventions to promote positive change. Emerging from the realms of family planning and population studies in the 1950s, the knowledge, attitude, and practice (KAP) model has gained prominence as a popular survey tool in social research (Vandamme, 2009).

Through structured and standardised questionnaires, the KAP model quantifies and analyses what individuals know, believe, and do regarding a specific topic of interest (Nguyen et al., 2019; Andrade et al., 2020). This data can pinpoint knowledge gaps, attitude barriers, and patterns of behaviour, aiding in understanding and action on pertinent issues. Augmenting quantitative methods with qualitative approaches, such as interviews, can enhance the credibility and reliability of the survey (Launiala, 2009). Interconnections among knowledge, attitudes, and practices have been observed in previous studies (Valente et al., 1998). For instance, knowledge and skills are deemed necessary for behavioural change, while positive attitudes toward behaviour correlate with better motivational intention (Ajzen, 1991). Subjective norms, reflecting social influences, and perceived behaviour control, indicative of ease or difficulty in performing behaviour, also impact behavioural intention. Additionally, external factors, such as farmer characteristics and environmental conditions, shape farming practices (Meijer et al., 2015).

Zaidi et al. (2022) argued that aspects of knowledge, attitudes, and practices regarding herbal medicines are essential to explore within complementary medicine. The findings also show associations with different demographic backgrounds. Based on

Santos' (2017) research, factors influencing the adoption or rejection of gardening plants include participants' background data, knowledge factors, space, time, motivations, and level of interest in gardening, as well as health, finance, community, and environmental concerns. Minor factors are the convenience of the market, the difficulty of work, and laziness. Additionally, in the study by Orkwiszewski (2014), the first step was to interview to determine the baseline knowledge of medicinal plants in the Carhuamayo region. The findings reveal no statistically significant trends in medicinal plant knowledge related to gender, migrant status, or age. According to Siregar et al. (2020), the study revealed that the perceptions of megapolitan communities towards traditional medicinal plants are positive, particularly regarding personal factors, group influence factors, cultural factors, cultivation, and the marketing of these plants in Medan. Furthermore, it has a positive impact on the cultivation of medicinal plants in home yards and on agricultural land.

There are also urban community garden projects in the People's Housing Program area (PPR) that aim to provide a fresh food supply and generate income by combining crops with abandoned areas (Tajuddin et al., 2019). Research explicitly focused on establishing herbal gardens within individual residential areas remains scarce. Therefore, this study aims to investigate current knowledge, attitudes, and practices regarding herbal plants among residents in the Klang Valley, Malaysia, to understand better their engagement with this valuable resource in their living environments.

2. Method

2.1 Study area

The study was conducted in the Klang Valley region, home to approximately 9 million people. There are seven districts in the Klang Valley, namely Hulu Langat, Petaling, Gombak, Sepang, Klang, Wilayah Persekutuan Kuala Lumpur, and Wilayah Persekutuan Putrajaya. These areas were selected due to their urban characteristics and potential for residential herbal gardening initiatives. This study was conducted in the Klang Valley region, a major urban conglomeration located in the central part of Peninsular Malaysia. The Klang Valley encompasses seven administrative districts: Hulu Langat, Petaling,

Gombak, Sepang, Klang, Wilayah Persekutuan Kuala Lumpur (Federal Territory of Kuala Lumpur), and Wilayah Persekutuan Putrajaya (Figure 1). According to recent estimates, the Klang Valley is home to nearly 9 million residents, making it the most populous region in Malaysia (Department of Statistics Malaysia, 2023).

The selection of the Klang Valley as the study site was driven by its rapid urbanisation, diverse demographic composition, and increasing demand for sustainable urban initiatives, such as home-based herbal gardening. Urban households in the Klang Valley are increasingly adopting small-scale gardening practices due to limited space, rising health consciousness, and greater awareness of sustainable living (Tan & Ismail, 2022; Moghavvemi et al., 2025).
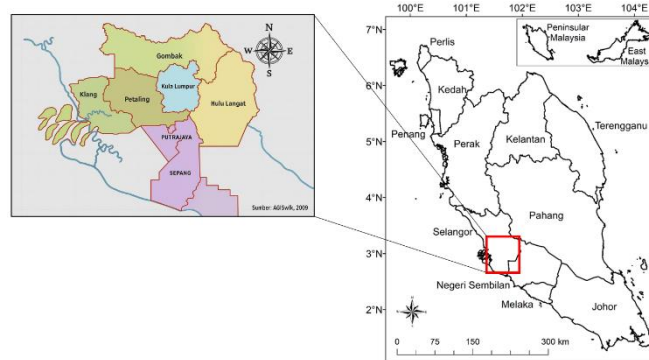

Figure 1. A map of peninsular Malaysia showing the study area in the Klang valley

2.2 Data collection

Data were collected using convenience sampling across seven districts in the Klang Valley to ensure fair representation of the urban community. Based on Krejcie and Morgan's (1970) table for determining sample size, a population of 1 million or more requires a sample of 384 to represent the population adequately. Krejcie and Morgan's formula for determining the sample is as follows:

$S = (X^2 * N * P * (1 - P)) / (d^2 * (N - 1) + X^2 * P * (1 - P))$
Where:
S = required sample size
X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level
N = population size
P = population proportion

d = degree of accuracy expressed as a proportion

Therefore, the obtained sample size of 393 was deemed sufficient for this study. The target respondent is a Malaysian resident aged 18 years and above. A questionnaire survey was used to collect feedback on knowledge, attitudes, and practices related to the phenomenon under study from a larger population. The questionnaire included sections on individual backgrounds and the research's central focus.

The questionnaire consisted of closed-ended questions, including dichotomous questions that required a simple 'yes' or 'no' response, as well as 5-point Likert-scale items. The Likert scale was used to evaluate the respondents' perceptions (Lim & Tham, 2020; Hod et al., 2021). It consisted of four parts as follows.

- Part A - Demographic Information: This section gathered data on the respondents' background characteristics.
- Part B – Knowledge of Herbal Plants: This section assessed the respondents' understanding and awareness of herbal plants.
- Part C - Attitude towards Cultivating Herbal Plants in Residential Areas: This section explored respondents' opinions and beliefs about cultivating herbal plants at home.
- Part D – Practice on Growing Herbal Plants: This section examined respondents' current practices and methods for cultivating herbal plants.

2.3 Pilot study

A pilot study was conducted to evaluate the questionnaire's reliability and validity prior to the main data collection. The questionnaire was administered to 30 respondents, who were asked to provide feedback on the clarity, structure, and relevance of the items. These participants completed printed versions of the questionnaire, and their suggestions were used to identify areas requiring improvement.

To assess the instrument's internal consistency, Cronbach's alpha was calculated. A threshold of 0.70 or higher was considered indicative of acceptable to high reliability. Based on both the reliability results and respondents' qualitative feedback, necessary revisions were made to refine the questionnaire and enhance its overall quality for use in the main study.

2.4 Data analysis

Quantitative data obtained through the questionnaire survey were analysed using IBM SPSS Statistics Version 22. The data analysis process commenced with the preparation of raw data, which involved creating a data file, defining variable properties, and assigning value labels to ensure consistency and accuracy. Once the dataset was finalised, both descriptive and inferential statistical analyses were carried out. Descriptive statistics were used to summarise the demographic profile of the respondents and key variables. In contrast, inferential statistics were employed to examine relationships and test hypotheses relevant to the study objectives.

Prior to conducting inferential analyses, the data distribution was assessed using both graphical (histograms) and statistical methods. Specifically, the Kolmogorov-Smirnov test was applied for larger sample sizes, while the Shapiro-Wilk test was used for smaller samples. To examine the relationships among knowledge, attitude, and practice regarding herbal plant cultivation, Pearson's correlation analysis was employed. Statistical significance was evaluated at two thresholds: $p < 0.05$ and $p < 0.01$. Additionally, the Kruskal-Wallis H test, a non-parametric alternative to one-way ANOVA, was utilised to compare differences among three or more independent groups based on selected demographic variables. The results were interpreted based on the corresponding p-values, with a significance level set at $p < 0.05$.

3. Results

3.1 Demographic facts

The demographic background of the respondents consists of approximately equal numbers of males (48.9%) and females (51.1%). Most respondents in this survey were aged 40-49 (35.88%), and a smaller proportion were aged under 20 (15, 3.82%). This showed the youth's involvement with the older population. Most of the respondents are Malay,

followed by 5.85% Chinese, 4.83% Indian, and 1.53% other races. The highest number of respondents was from Hulu Langat. Followed by Petaling (17.56%), Gombak (14.76%), Sepang (13.74%), Klang (13.23%), Wilayah Persekutuan Kuala Lumpur (10.94%), and Wilayah Persekutuan Putrajaya (10.18%). The majority of respondents have a bachelor's degree. Only 1.53% of respondents have no education. Next, most respondents are working with the private sector (35.37%), while only 13.49% are not working. Lastly, the highest range of the respondent household's monthly income was RM 3,001 to RM 4,000 (27.23%). Lastly, the same percentage of respondents, 13.99% (55 respondents), had household monthly incomes of RM 2,001 to RM 3,000 and RM 1,200 to RM 2,000.

3.2 Levels of knowledge, attitude and practices towards herbal plant cultivation

For general knowledge of herbal plants, a slightly higher proportion of respondents have moderate knowledge (36.6%). Besides, the use of herbal plant knowledge showed a neutral response (35.1%). For cultivation knowledge, neutral responses are shown as 46.5%. While knowledge of the side effects of herbal plants also indicated a preference for neutral agreement (42.7%). In addition, knowledge of precautions when using/taking herbal plants showed neutral responses from 148 respondents (37.7%). Lastly, knowledge about the food functions and medicinal importance of herbal plants elicited neutral responses from 144 respondents (36.6%). The results revealed that the respondents have moderate knowledge of herbal plants. The second question of 'yes' and 'no' is to determine the knowledge of the types, benefits, and methods of cultivation of herbal plants of the respondents.

These questions yielded a high percentage of correct answers, indicating good knowledge among the respondents. The third question concerns the recognition of common herbal plants (e.g., turmeric, lime, pandan, lemongrass) categorised by cuisine, 'ulam,' and their medicinal functions. Most respondents responded to the most common types of herb plants, indicating their awareness and utilisation of these plants. The last question in Section B concerns the source of knowledge about herbal plants (Figure 2). The data revealed high media impacts, given the information's global reach via

internet sources (31.6%). Secondly, family or relatives (26.2%) are important because they share knowledge of herbal plants across generations. Printed materials also yield a higher output (16%), including magazines, books, and journals. Additionally, friends also play a role in recommending the use and planting of herbal plants, which accounts for 13.7%. Finally, the combined campaign from both the government and the private sector shows a 12.5% increase.
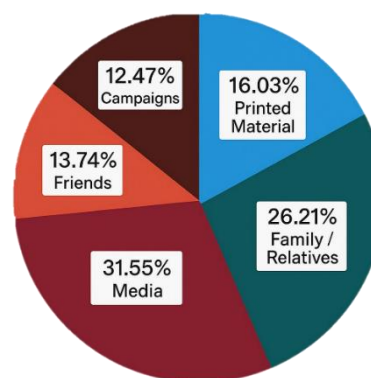

Figure 2. Source of knowledge and information on herbal plants by respondents

To evaluate the level of attitude towards herbal plant cultivation in a residential area, five (5) Likert-scale questions were used. Almost half of the respondents (43%, 169) strongly agreed that plant cultivation promotes good health. 45.8% of respondents (180) strongly agree that herbaceous plants provide tranquillity and beauty in the landscape. Next, 47.1% (185 respondents) strongly agree that planting herbs is beneficial for individuals and the community. Furthermore, 47.1% (185 respondents) strongly agreed that herbal plants can help reduce living expenses. In terms of cultivating herbs, encouraging sustainable agricultural practices was supported by 39.9% of respondents, specifically 157 individuals who agreed. Next, cultivating herbaceous plants can contribute to the restoration of degraded residential land, further supporting biodiversity and ecosystem health, as strongly agreed by respondents (39.4%, 155 responses). Most respondents strongly agreed that promoting a positive effect on mental health is beneficial, with 42.2% (166 responses) in favour. Lastly, cultivating herb plants in space available was strongly agreed upon by 171 respondents (43.5%). This showed a moderate attitude towards cultivating

herbal plants in a residential area.

The level of practice in planting types of herbal plants by residents in urban areas was determined using frequencies and percentages from the five (5) Likert-scale questions. Planting in the pots was often used by the respondents, as shown by 63 respondents (16%). Additionally, they often utilise vacant land, as indicated by 141 respondents (35.9%). 113 respondents (28.8%) reported growing hydroponically. The plant in a wicking box accounted for a significant percentage of rare responses (28.2%). Next, plants in tiers showed an average score, which is 'sometimes, as represented by 96 respondents (24.4%). In terms of getting advice from experienced people, the response was 'sometimes', as represented by 110 respondents (28%). Watering the herb plants was reported as 'often' by 124 respondents (31.6%). Fertilising herbaceous plants was also shown to be 'often' by most respondents, which is 116 respondents (29.5%). This showed that respondents prefer planting in pots and using vacant land rather than hydroponic, wicking box, or tiered methods, as there is no need for a specific process. Respondents also practice good planting practices by seeking advice, watering, and fertilising the plant.

3.3 Respondents' knowledge level of herbal plants

Table 1 presents the frequencies, percentages, and means of responses regarding knowledge of herbal plants. The majority of respondents demonstrated a moderate level of general knowledge of herbal plants, with 144 (36.6%) falling into this category. A smaller proportion, 4.8%, indicated a generally poor level of knowledge. Regarding the specific uses of herbal plants, the most frequent response was neutral, with 138 respondents (35.1%), followed by a moderately responsive group of 138 respondents (35.1%). Similarly, when asked about their knowledge of herbal plant cultivation, the most common response was neutral, accounting for 168 respondents (42.7%), while 22.1% showed a moderately responsive level. Knowledge about the potential side effects of herbal plants also elicited a neutral response from 130 respondents (33.1%).

Furthermore, when questioned about precautions to take when using or consuming herbal plants, the most frequent response was neutral (148 respondents, 37.7%), and 23.9% reported a lower level of knowledge. Lastly, knowledge of food functions and the importance of medicinal plants also produced a neutral response from 144 respondents (36.6%).

The mean scores for respondents' knowledge of herbal plants ranged from 2.91 to 3.29, indicating that participants in this study had a moderate level of knowledge. This finding is consistent with Soltanipour's (2022) research, which also reported a relatively low level of knowledge about herbal remedies.

Table 1. Frequency and percentage of the knowledge level of herbal plants (n:286)

No.	Knowledge	Knowledge Level	Frequency	Percentage (%)	Mean
1.	Knowledge of herbal plants in general.	Not good Less good Neutral Moderately Very good	19 67 25 144 38	4.8 17.0 31.8 36.6 9.7	3.29
2.	Knowledge of the use of herbal plants.	Not good Less good Neutral Moderately Very good	24 72 138 121 38	6.1 18.3 35.1 30.8 9.7	3.20
3.		Not good Less good Neutral Moderately Very good	38 67 168 87 33	9.7 17.0 42.7 22.1 8.4	3.03
4.	Knowledge of the side effects of the	Not good	43	10.9	

No.	Attitude	Agreement Level	Frequency	Percentage (%)	Mean
	herbal plant.	Less good	95	24.2	
		Neutral	130	33.1	2.94
		Moderately Very	91	23.2	
		good	34	8.7	
5.	Knowledge of precautions when using/taking herbal plants.	Not good	38	9.7	
		Less good	94	23.9	
		Neutral	148	37.7	2.91
		Moderately Very	93	23.7	
		good	20	5.1	
6.	Knowledge about herbal plants primarily focuses on their food functions and the importance of medicinal plants.	Not good	22	5.6	
		Less good	56	14.2	
		Neutral	144	36.6	3.28
		Moderately Very	130	33.1	
		good	41	10.4	

3.4 Respondent's attitude towards herbal plant cultivation in a residential area

Attitude plays a significant role in shaping respondents' willingness to cultivate herbal plants in their living environments. In this study, attitudes were assessed to determine the extent of agreement with statements regarding the benefits, importance, and personal value of cultivating herbal plants in residential areas. Table 2 presents the frequency and percentage of agreement at the attitude level regarding herbal plant cultivation.

Respondents showed a positive attitude towards cultivating herbal plants, with all mean scores above 4.0. The highest agreement was that cultivating herbs benefits both individuals and the community (Mean = 4.25), while the lowest, though still positive, was its role in restoring degraded land (Mean = 4.08). Overall, the results indicate strong social, health, and economic support for herbal planting, with ecological benefits viewed favourably but less emphasised. This is supported by Soltanipour et al. (2022), who report a favourable attitude towards herbal medicine among participants. This fairness in attitudes reflects the complex interplay of personal beliefs, perceptions, and considerations that influence adherence to herbal plants in modern lifestyles (Ikram et al., 2024).

Table 2. Frequency and percentage of agreement on attitude level towards herbal plant cultivation (n:393)

No.	Attitude	Agreement Level	Frequency	Percentage (%)	Mean
1.	Cultivating herbal plants has a positive effect on my health, such as promoting perspiration.	Strongly Disagree	11	2.8	
		Disagree	2	0.5	4.18
		Neutral	63	16.0	
		Agree	148	37.7	
		Strongly Agree	169	43.0	
2.	Various types of herbaceous plants provide tranquillity and beauty in the residential landscape.	Strongly Disagree	9	2.3	
		Disagree	9	2.3	4.19
		Neutral	59	15.0	
		Agree	136	34.6	
		Strongly Agree	180	45.8	
3.	The practice of planting herbs benefits individuals and communities.	Strongly Disagree	9	2.3	
		Disagree	2	0.5	4.25
		Neutral	57	14.5	
		Agree	140	35.6	
		Strongly Agree	185	47.1	
4.	Cultivation of herbal plants can help reduce living expenses.	Strongly Disagree	11	2.8	
		Disagree	2	0.5	
		Neutral	76	14.5	4.16
		Agree	140	35.6	
		Strongly Agree	185	47.1	
5.	Cultivating herbs	Strongly Disagree	8	2.0	

No.		Level of Practice	Frequency	Percentage (%)	Mean
	encourages sustainable agricultural practices, such as composting and water conservation, which, in turn, can support climate change mitigation efforts.	Disagree Neutral Agree Strongly Agree	5 68 155 157	1.3 17.3 39.4 39.9	4.14
6.	Cultivating herbaceous plants can help restore degraded residential land, further supporting biodiversity and ecosystem health.	Strongly Disagree Disagree Neutral Agree Strongly Agree	11 5 82 140 155	2.8 1.3 20.9 35.6 39.4	4.08
7.	Planting herbs can have a positive effect on mental health, such as reducing stress.	Strongly Disagree Disagree Neutral Agree Strongly Agree	10 4 61 152 166	2.5 1.0 15.5 38.7 42.2	4.17
8.	Residents should utilise the available space in their residential areas to grow herbs.	Strongly Disagree Disagree Neutral Agree Strongly Agree	9 3 63 147 171	2.3 0.8 16.0 37.4 43.5	4.19

3.5 Respondents' practice level regarding the types of herbal plants planted

Table 3 presents respondents' actual practices in cultivating herbal plants in their residential areas. Results highlight the types of planting methods commonly adopted, reflecting the community's engagement, preferences, and practical approaches towards integrating herbal cultivation into their daily living environment.

The results show that respondents engaged in several practices related to herbal plant cultivation, though at varying levels. The most common practices were using vacant land for planting (Mean = 3.45), watering herbs (Mean = 3.49), and fertilising plants (Mean = 3.43), indicating consistent care and maintenance. Planting in pots or hanging pots was also widely practised (Mean = 3.22). In contrast, less frequent practices included planting hydroponically (Mean = 2.74), using wicking boxes (Mean = 2.56), and tier planting (Mean = 2.73). This indicates a lower adoption of these methods. Overall, the findings indicate that respondents tend to prefer simple, space-efficient, and practical methods over more specialised planting techniques.

Table 3. Frequency and percentage of practice factors towards herbal plant cultivation (n:393)

No.	Practices	Level of Practice	Frequency	Percentage (%)	Mean
1.	Plant herbs in pots or hanging pots.	Never Rarely Sometimes Often Always	41 70 107 112 63	10.4 17.8 27.2 28.5 16.0	3.22
2.	Using vacant land in the residential area to grow herbs.	Never Rarely Sometimes Often Always	39 49 83 141 81	9.9 12.5 21.1 35.9 20.6	3.45
3.	Planting Hydroponically.	Never Rarely Sometimes	94 70 113	23.9 17.8 28.8	2.74

		Often	78	19.8	
		Always	38	9.7	
4.	Plant in a wicking box.	Never	90	22.9	
		Rarely	111	28.2	
		Sometimes	97	24.7	2.56
		Often	72	18.3	
		Always	23	5.9	
5.	Planting herbaceous plants in tiers.	Never	95	24.2	
		Rarely	79	20.1	
		Sometimes	96	24.4	2.73
		Often	84	21.4	
		Always	39	9.9	
6.	Get advice from experienced people on growing herbs.	Never	46	11.7	
		Rarely	67	17.0	
		Sometimes	110	28.0	3.20
		Often	101	25.7	
		Always	69	17.6	
7.	Watering the herb plants that have been planted.	Never	28	7.1	
		Rarely	54	13.7	
		Sometimes	97	24.7	3.49
		Often	124	31.6	
		Always	90	22.9	
8.	Fertilise herbaceous plants.	Never	28	7.1	
		Rarely	58	14.8	
		Sometimes	108	27.5	3.43
		Often	116	29.5	
		Always	83	21.1	

3.6 Relationships of resident knowledge, attitudes, and practices on herbal plant cultivation

The relationships among residents' knowledge, attitudes, and practices regarding herbal plant cultivation are presented in Tables 4-6. A significant positive relationship was found between general knowledge and attitude 1 (r = 0.337, p < 0.01), and between general knowledge and attitude 5 (r = 0.315, p < 0.01). Knowledge and practice showed both low and moderate correlations. For example, the correlation between pot planting and knowledge of uses was moderate (r = 0.436, p < 0.01).

Use-related knowledge showed low but significant correlations with attitude 1 (r = 0.335, p < 0.01) and attitude 4 (r = 0.282, p < 0.01). The correlations between attitudes and practices ranged from low to high. High positive correlations were observed between attitude 1 and watering (r = 0.537, p < 0.01) as well as fertilising (r = 0.524, p < 0.01). Other practices, such as hydroponic methods, wicking systems, tier planting, and seeking advice, showed low to moderate correlations with attitudes.

Table 4. Correlation of knowledge and attitude factors on herbal plant cultivation

Knowledge Type	Attitude 1	Attitude 2	Attitude 3	Attitude 4	Attitude 5	Attitude 6	Attitude 7	Attitude 8
General Knowledge	.337**	.279**	.305**	.317**	.315**	.227**	.294**	.285**
Uses Knowledge	.335**	.258**	.295**	.282**	.247**	.191**	.239**	.253**
Cultivation Knowledge	.304**	.230**	.248**	.297**	.289**	.219**	.263**	.269**
Side Effect Knowledge	.301**	.243**	.256**	.262**	.255**	.201**	.209**	.212**

Precautions Knowledge	.271**	.247**	.237**	.244**	.259**	.203**	.222**	.191**
Food Function Knowledge	.363**	.319**	.346**	.351**	.326**	.256**	.336**	.314**

Note: r = Pearson Correlation Coefficient; Sig. = Significance level (2-tailed); p < .01, hence significant at the 0.01 level (2-tailed)

- Altitude 1 : Cultivating herbal plants has a positive effect on my health, such as promoting perspiration.
- Altitude 2 : Various types of herbaceous plants provide tranquillity and beauty in the residential landscape.
- Altitude 3 : The practice of planting herbal plants is beneficial for the individual and the community.
- Altitude 4 : Cultivation of herbal plants can help reduce living expenses.
- Altitude 5 : Cultivating herbs encourages sustainable agricultural practices, such as composting and water conservation, which can indirectly contribute to climate change mitigation efforts.
- Attitude 6 : Cultivating herbaceous plants can contribute to the restoration of degraded residential land, further supporting biodiversity and ecosystem health.
- Altitude 7 : The activity of planting herbs can have a positive effect on mental health, such as reducing stress.
- Altitude 8 : The space available in the residential area should be used by residents to grow herbs.

Table 5. Correlation of residents' knowledge and practices on herbal plant cultivation

	Practice pots	Practice vacant	Practice hydroponic	Practice wicking	Practice tiers	Practice advice	Practice waters	Practice fertiliser
General Knowledge	.498**	.305**	.270**	.201**	.320**	.299**	.413**	.387**
Uses Knowledge	.436**	.375**	.324**	.184**	.362**	.331**	.386**	.360**
Cultivation Knowledge	.436**	.367**	.353**	.309**	.380**	.305**	.353**	.343**
Side Effects Knowledge	.460**	.329**	.358**	.263**	.361**	.336**	.393**	.395**
Precautions Knowledge	.410**	.224**	.302**	.158**	.322**	.338**	.303**	.340**
Food Functions Knowledge	.464**	.323**	.322**	.254**	.361**	.315**	.386**	.371**

Note: Correlation Coefficients are presented in the first row of each cell; significance (2-tailed) values are in the second row. ** indicates significance at p < 0.01

Table 6. Correlation of attitude and practice factors on herbal plant cultivation

	Practice pots	Practice vacant	Practice hydroponic	Practice wicking	Practice tiers	Practice advice	Practice water	Practice fertiliser
Attitude 1	.406**	.451**	.379**	.365**	.463**	.484**	.537**	.524**
Attitude 2	.423**	.460**	.315**	.333**	.446**	.455**	.531**	.514**
Attitude 3	.388**	.423**	.323**	.351**	.436**	.435**	.510**	.489**
Attitude 4	.414**	.431**	.330**	.296**	.373**	.415**	.515**	.469**
Attitude 5	.403**	.394**	.337**	.379**	.420**	.486**	.464**	.464**
Attitude 6	.359**	.328**	.247**	.236**	.291**	.315**	.436**	.414**
Attitude 7	.378**	.408**	.258**	.335**	.385**	.377**	.473**	.460**
Attitude 8	.383**	.475**	.255**	.307**	.366**	.417**	.504**	.478**

Note: Correlation Coefficients are presented in the first row of each cell; significance (2-tailed) values are in the second row. ** indicates significance at p < 0.01

- Altitude 1 : Cultivating herbal plants has a positive effect on my health, such as promoting perspiration.
- Altitude 2 : Various types of herbaceous plants provide tranquillity and beauty in the residential landscape.
- Altitude 3 : The practice of planting herbal plants is beneficial for the individual and the community.
- Altitude 4 : Cultivation of herbal plants can help reduce living expenses.
- Altitude 5 : Cultivating herbs encourages sustainable agricultural practices, such as composting and water conservation, which can indirectly contribute to climate change mitigation efforts.
- Attitude 6 : Cultivating herbaceous plants can contribute to the restoration of degraded residential land, further supporting biodiversity and ecosystem health.
- Altitude 7 : The activity of planting herbs can have a positive effect on mental health, such as reducing stress.
- Altitude 8 : The space available in the residential area should be used by residents to grow herbs.

4. Discussion

The study revealed that urban residents in Klang Valley possessed a moderate level of knowledge regarding herbal plants. Most respondents were aware of common herbs such as turmeric, pandan, lime, and lemongrass, which are widely used in Malaysian households for culinary and medicinal purposes. However, knowledge of side effects, cultivation methods, and precautions was less developed, with many respondents indicating neutrality. This moderate knowledge level aligns with Soltanipour's (2022) findings, which reported limited awareness of the proper use and safety of herbal remedies among the general public. The reliance on the media and family as key sources of knowledge further reflects the informal, generational transfer of herbal plant information in Malaysia.

In terms of attitudes, respondents demonstrated highly positive perceptions of herbal plant cultivation. Most people agreed that cultivating herbs promotes health, reduces living expenses, and enhances the aesthetic appeal of residential landscapes. Positive attitudes were also expressed towards broader ecological benefits, such as biodiversity support and sustainable practices. These findings align with Ikram et al. (2024), who highlighted that community attitudes towards herbal medicine and cultivation are shaped not only by health considerations but also by cultural values and environmental awareness. The high mean scores across attitude items in this study indicate a strong potential for residents to adopt and expand herbal cultivation if provided with proper guidance and institutional support.

Regarding practices, residents were most engaged in accessible and low-cost methods such as planting in pots and using vacant land, alongside routine maintenance activities like watering and fertilising. More advanced methods, such as hydroponic systems, wicking boxes, and tier planting, were less practised, indicating that residents prefer simpler approaches that integrate easily into daily life. This is consistent with Subramaniam et al. (2020), who found that Malaysian households prioritise practicality and affordability in adopting urban agriculture practices.

The overall moderate knowledge, positive attitudes, and selective practices observed in this study carry important policy implications. Malaysia's National Agrofood Policy 2021–2030 (NAP 2.0) encourages household-level food security and promotes urban agriculture initiatives. Similarly, the National Policy on Traditional and Complementary Medicine (2017–2027) supports the safe and sustainable use of herbal plants in healthcare. This would not only improve residents' practices but also support the broader goals of self-sufficiency, sustainable living, and public health.

The relationships among residents' knowledge, attitudes, and practices in herbal cultivation exhibit varying levels of correlation. The study revealed a significant positive relationship between a resident's general knowledge and their attitude toward the health benefits and sustainability of growing herbal plants. For example, general knowledge showed a moderate correlation with the belief that cultivating herbal plants has a positive effect on health and can contribute to sustainable agricultural practices.

However, the correlation between knowledge and

practice is less consistent, with both low and moderate correlations observed. This suggests that merely knowing about herbal plants does not always translate into action. In contrast, the document highlights a strong connection between an individual's attitudes and their practical use of medicinal plants. The belief in the benefits of these plants appears to be a more powerful motivator for cultivation than knowledge alone. This is consistent with a study by Arumugam (2019), which also found a stronger relationship between consumers' attitudes and their practices than between their attitudes and their knowledge.

The cultivation of herbal plants by urban residents, particularly within a dense metropolitan area like the Klang Valley, carries significant implications for sustainable urban development and community well-being. This practice presents a multifaceted solution to several challenges faced by urban populations, including food security, public health, environmental sustainability, and social cohesion.

One of the most immediate benefits is enhanced food security and reduced household expenses. By serving as an alternative food source, urban farming allows residents to cultivate their own produce, thereby mitigating the rising cost of living. This practice is actively supported by governmental bodies, such as the Department of Agriculture Malaysia (DOA), which promotes such projects to help urban dwellers reduce their kitchen expenses.

Furthermore, cultivating these plants has a demonstrable impact on health and well-being. Beyond the nutritional benefits of access to fresh, homegrown produce, gardening has been shown to positively impact mental health by reducing stress. This activity also serves as a tangible platform for raising community awareness about healthy eating habits and promoting a more holistic approach to health. The promotion and expansion of herbal cultivation in the Klang Valley would not only foster sustainable urban living but also support the local economy. However, they would also directly enhance the health, financial stability, and social fabric of its residents. The integration of these practices into the urban landscape is a strategic step towards building a more resilient and self-sufficient community.

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