

การจัดการความรู้การใช้สมุนไพรในครัวเรือนเพื่อการดูแลสุขภาพของผู้สูงอายุจังหวัดลำปาง
Knowledge Management of Household Herb Use for
Older Adults' Health Care in Lampang Province

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บทคัดย่อ

การวิจัยผสมผสานครั้งนี้มีวัตถุประสงค์เพื่อศึกษาพฤติกรรมการใช้สมุนไพรในครัวเรือนและถอดบทเรียนองค์ความรู้การใช้สมุนไพรในครัวเรือนในการดูแลสุขภาพของผู้สูงอายุในจังหวัดลำปาง กลุ่มตัวอย่าง คือ ผู้สูงอายุที่มีอายุ 60-75 ปี จำนวน 397 คน และสัมภาษณ์เชิงลึกและสนทนากลุ่ม จำนวน 15 ราย เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูล ได้แก่ แบบสอบถามการจัดการความรู้การใช้สมุนไพรในครัวเรือนเพื่อการดูแลสุขภาพของผู้สูงอายุในจังหวัดลำปาง จำนวน 44 ข้อ ตรวจสอบความเที่ยงตรงเชิงเนื้อหาโดยหาค่า IOC มีค่าตั้งแต่ 0.84-1.00 และมีค่าความเชื่อมั่น (α) เท่ากับ 0.92 และแบบสัมภาษณ์การจัดการความรู้การใช้สมุนไพรในครัวเรือนเพื่อการดูแลสุขภาพของผู้สูงอายุในจังหวัดลำปาง สถิติที่ใช้ในการวิเคราะห์ข้อมูล ได้แก่ ค่าร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน และข้อมูลเชิงคุณภาพใช้การวิเคราะห์เชิงเนื้อหา ผลการศึกษา พบว่า กลุ่มตัวอย่างส่วนใหญ่ (ร้อยละ 76.83) เคยใช้สมุนไพรในการดูแลสุขภาพ มากกว่าครึ่งหนึ่ง (ร้อยละ 69.52) มีความรู้เรื่องการใช้สมุนไพรอยู่ในระดับสูง และมากกว่าครึ่ง (ร้อยละ 67.51) มีการใช้สมุนไพรโดยรับประทานสดหรือนำมาปรุงอาหาร เกือบครึ่งหนึ่ง (ร้อยละ 49.12) มีพฤติกรรมการใช้สมุนไพรอยู่ในระดับปานกลาง นอกจากนี้ ข้อมูลเชิงคุณภาพพบว่า ผู้สูงอายุมีความรู้เกี่ยวกับสมุนไพรในระดับดีมาก โดยสามารถระบุสรรพคุณและวิธีการใช้สมุนไพรได้อย่างถูกต้อง ส่วนผู้สูงอายุทั่วไปมีความรู้พื้นฐานในการใช้สมุนไพรที่พบได้ในครัวเรือน เช่น ขิง ฟักทะลายโจร ขมิ้นชัน และกระเทียม แสดงให้เห็นถึงภูมิปัญญาท้องถิ่นที่สามารถดูแลสุขภาพผู้สูงอายุได้อย่างเหมาะสม สะท้อนความเข้าใจในการใช้สมุนไพรพื้นบ้านผสมผสานกับข้อมูลทางวิทยาศาสตร์ยุคใหม่

คำสำคัญ: การจัดการความรู้, การใช้สมุนไพรในครัวเรือน, การดูแลสุขภาพ, ผู้สูงอายุ, จังหวัดลำปาง

Abstract

This mixed-methods research aimed to examine household herb use behaviors and to extract lessons learned regarding knowledge of household herb use for older adults' health care in Lampang Province. The sample consisted of 397 older adults aged 60-75 years for the quantitative study, and 15 participants for in-depth interviews and focus group discussions. The research instruments included (1) a 44-item questionnaire on knowledge management of household herb use for older adults' health care in Lampang Province, with content validity verified through IOC values ranging from 0.84 to 1.00 and reliability (α) of 0.92, and (2) an interview guide on knowledge management of household herb use for older adults' health care in Lampang Province. Data were analyzed using percentages, means, and standard deviations; qualitative data were analyzed using content analysis. The findings showed that most participants (76.83%) had used herbs for health care. More than half (69.52%) had a high level of knowledge about herb use, and more than half (67.51%) used herbs by consuming them fresh or incorporating them into food. Nearly half (49.12%) demonstrated a moderate level of herb-use behavior. Qualitative findings indicated that the

older adult participants had very good knowledge of herbs and could accurately describe their properties and how to use them. In addition, older adult participants demonstrated basic knowledge of common household herbs, such as ginger, *Andrographis paniculata*, turmeric, and garlic, reflecting local wisdom that can appropriately support older adults' health. These findings reflect an understanding of traditional herbal medicine integrated with modern scientific information.

Keywords: Knowledge management, Household herb use, Health care, Older adults, Lampang Province

1. Introduction

Knowledge management (KM) is a systematic approach to capturing, organizing, sharing, and using an organization's knowledge to improve efficiency and competitiveness (Heisig et al., 2020). In the context of health development and Thai traditional medicine (KM) is crucial for preserving and transmitting Thai herbal wisdom as cultural heritage. KM also facilitates the delivery of information and knowledge to the right people at the right time (APQC, 2025). Organizational knowledge is commonly classified into two types: explicit knowledge, which can be recorded and easily shared, and tacit knowledge, which is embedded in personal experience, intuition, and skills and is difficult to articulate (Venkitachalam & Busch, 2012).

Thai herbs have a long history dating back to the Sukhothai period and continuing to the present day. Knowledge from Indian Ayurvedic medicine has been integrated with local wisdom (Tungkwampian et al., 2015; Fakkham et al., 2012). Thai herbs are used in many areas, including food, medicine, health care, and beauty products. However, managing Thai herbal knowledge remains challenging, particularly in safeguarding local experts' tacit knowledge, which is often transmitted across generations through practice and direct experience (Ruangsarn et al., 2021). Without appropriate management, such knowledge may be lost with the older generation. Tungkwampian et al. (2015) developed a Thai herbal knowledge base using ontology techniques and proposed ten core concepts: product combinations, finished product forms, herbal substances, clinical warnings, flavor, triads, health problems, and consumption methods. This system helps link scientific information with language that the general public can understand.

Thailand has entered an aging society, leading to growing interest in the use of herbal medicines as complementary approaches for illness management and health promotion among older adults. Evidence from a primary care setting in Thailand indicates a high prevalence of herbal medicine use among elderly patients, although many users did not adequately consider principles of safe herbal medicine use, highlighting the need for greater attention from healthcare providers (Ananchaisarp et al., 2021). Demand for herbs in Thailand is also growing rapidly, with a domestic market value of approximately 42.4 billion baht in 2018 and an 11% increase from the previous year (Thai Embassy Maputo, 2020). The Thai government has emphasized the role of Thai herbs in health security and economic sustainability through the First National Master Plan on Thai Herbal Development, 2017–2021. Strategy 3 aims to increase the use of herbs for illness treatment and health promotion and to strengthen their integration within the national health system (Ministry of Public Health, 2017). The Ministry of Public Health has also set a target to increase the use of herbal medicines in the National Health Security System to at least 1.5 billion baht by the end of 2025 and 3 billion baht by 2026 (Nation Thailand, 2025). These targets demonstrate the government's commitment to incorporating Thai traditional medicine into mainstream healthcare.

Kanjanahattakij et al. (2019) reported that 32.6% of a Thai worker population used herbal or traditional medicine, and that herbal and traditional medicine use was more common among individuals with self-reported chronic diseases. This finding underscores the continuing importance of herbs and

traditional medicine within Thailand's health system. Although Thai people have long used household herbs for self-care and primary treatment, systematic household-level promotion and knowledge management remain limited. Jungsomjatepaisal (2019) developed a prototype for promoting the use of herbal medicine in Thai households and found that, after implementation, household practice in using herbal medicine for illness treatment increased substantially. This evidence suggests that household herbal use can be strengthened when community-based mechanisms, practical guidance, and systematic monitoring are integrated into local health promotion. However, as Thailand transitions into an aging society with increasing demand for herbal medicine, there remains a critical gap in systematic knowledge management of household herbal use among older adults, especially at the community level. The key challenge is preserving tacit knowledge embedded in older adults' practices before this wisdom is lost (Ruangsarn et al., 2021). While previous research has developed ontology-based Thai herbal knowledge systems that incorporate scientific information (Tungkwampian et al., 2015) and explored AI-driven approaches for collecting herbal knowledge (Yaiprasert & Yusakul, 2022), these efforts have largely focused on formal healthcare settings rather than community-based household practices. The Northern Research and Development Institute's preliminary research indicated that Lampang residents use herbs for various purposes; however, it did not comprehensively examine behavioral patterns or establish a knowledge management framework tailored to older adults in this region.

Thai herbal knowledge management faces several challenges. First, it involves conserving and transmitting tacit knowledge held by older generations with extensive experience. Second, it requires integrating traditional knowledge into modern healthcare systems. Third, it requires ensuring the quality and safety of herbal products. One possible approach is to apply artificial intelligence (AI) to support herbal knowledge management. Yaiprasert & Yusakul (2022) demonstrated the use of web-scraping techniques combined with machine learning to collect and classify Thai herbal knowledge from online sources, thereby improving access and processing efficiency. In addition, Sukparseart et al. (2024) developed a semantic Thai herb knowledge mining system for treatment, showing that semantic processing and knowledge mining can be applied to organize Thai herbal information in a more systematic and retrievable form. These approaches could be applied to Thai herbal information systems to integrate knowledge from multiple sources and support more accessible, evidence-informed, and systematic use of herbal knowledge.

Nevertheless, there has been no comprehensive mixed-methods study that systematically investigates both (1) quantitative patterns of household herbal use behaviors and (2) qualitative dimensions of knowledge management practices among older adults in Lampang Province. Empirical evidence is still limited regarding how older adults use, preserve, and transmit herbal knowledge within households. Therefore, this study addresses these gaps by examining: (1) the extent and patterns of household herbal use among older adults in Lampang Province; (2) their knowledge levels regarding herbal properties and applications; (3) the ways this tacit knowledge is managed and transmitted within households; and (4) best practices that can be extracted and systematized to support intergenerational knowledge transfer. Understanding these behavioral and knowledge management dimensions is essential for designing community-based interventions that preserve local herbal wisdom, support health security objectives, reduce healthcare costs, and ensure sustainable transmission of this cultural heritage.

Knowledge management is essential for the long-term preservation and development of Thai herbal wisdom, particularly in an aging society that requires effective and affordable healthcare options. Integrating tacit and explicit knowledge through KM supports intergenerational transfer and strengthens Thailand's herbal sector. Research on household herbal use among older adults in Lampang Province highlights the need for community-level KM to sustain knowledge transmission and promote appropriate

use of Thai herbs in health care. Such efforts can reduce healthcare expenditure, increase public understanding of safe herbal use in daily life, and enhance the value of Thai herbs, creating future economic opportunities for local producers. Government support, appropriate use of modern technology, and collaboration among local experts and academics will be important in advancing Thai herbs as a sustainable sector and strengthening competitiveness in the global market.

2. Methodology

Primary data were collected through a survey, and secondary data were obtained from research articles, theses, and online sources.

Population and Sample: The study population consisted of older adults residing in Mueang District, Lampang Province. The sample size was determined using Yamane's (1973) formula.

$$\frac{N}{1+Ne^2} \quad (1)$$

Based on the calculation, the required sample size was 397, using a 95% confidence level and a 5% margin of error. The inclusion criteria were older men and women aged 60–75 years who were able to communicate effectively and had no major physical limitations. A simple random sampling method was used to select 397 participants from 14 subdistricts (Table 1).

This study used a questionnaire on household herbal use behavior among older adults in Mueang District, Lampang Province, adapted from Tasnakon's (Inthajak, 2021) research instrument. The questionnaire comprised three sections: (1) general information, (2) knowledge of household herbal use, and (3) household herbal use behavior. Content validity was assessed using IOC values of 0.84–1.00; item discrimination (R_{xy}) ranged from 0.539 to 0.861; and reliability (α) was 0.92. An interview guide on knowledge management of household herbal use for older adults' health care in Lampang Province was also evaluated: IOC values were 0.88–1.00; item discrimination (R_{xy}) ranged from 0.622 to 0.845; and reliability (α) was 0.94. The questionnaire was pilot-tested with 30 older adults.

Table 1. presents the proportion of older adults aged 60–75 years in Mueang District, Lampang Province, who were selected through simple random sampling from 14 subdistricts

Subdistrict	Number of Population (Persons)	Samples (Persons)
Tumbon Suandok	1,426	11
Tumbon WieangNuae	3,340	25
Tumbon Klouyprae	2,858	22
Tumbon Soptui	3,737	28
Tumbon Chompoo	7,839	59
Tumbon Pongsanthong	5,059	38
Tumbon Huawieang	1,774	13
Tumbon Thungphai	1,996	15
Tumbon Prabat	5,621	43
Tumbon Bansadet	2,673	20
Tumbon Pichai	5,483	41
Tumbon Nikhompattana	1,304	10

Table 1. presents the proportion of older adults aged 60–75 years in Mueang District, Lampang Province, who were selected through simple random sampling from 14 subdistricts (Cont.)

Subdistrict	Number of Population (Persons)	Samples (Persons)
Tumbon Bohaew	5,076	38
Tumbon Tonthongchai	4,289	32
Total	52,475	397

Source: Lampang District Office, Lampang Province

For data collection, the researcher conducted fieldwork in person. An official request letter from Thailand National Sport University, Lampang Campus, was submitted to village headmen and community leaders to seek support for data collection. The researcher visited the study area to introduce themselves, explain the research objectives to participants, and request their cooperation in completing the questionnaire. Data collection lasted 75 days. The completed questionnaires were then checked for completeness and accuracy prior to statistical analysis. After the study was completed, the researcher returned the results to the community.

Quantitative data were analyzed using a statistical software package. Descriptive statistics (percentages, means, and standard deviations) were used to describe participant characteristics and household herbal use behaviors among older adults in Mueang District, Lampang Province. For the qualitative component, content analysis was used to categorize responses according to the study objectives, compare patterns of herbal use across contexts, and extract key lessons learned. To enhance trustworthiness, data credibility was established through triangulation by comparing information from multiple sources and member-checking with key informants to confirm the accuracy of interpretations.

3. Results

This section presents the study findings according to the research objectives and is divided into two parts: (1) household herbal-use behaviors among older adults in Lampang Province, and (2) extracted lessons learned regarding knowledge management of household herb use for older adults' health care. To establish the context for interpreting household herbal-use behaviors, the general characteristics of the respondents and their recent use of herbs are first presented in Table 2, followed by the patterns of herbal use by health condition in Table 3.

The study sample comprised 397 respondents, most of whom were female (272 respondents, 68.51%). The respondents' average age was 72.5 years, and many reported underlying conditions such as hypertension, diabetes, osteoarthritis, and gout. Regarding education, 152 respondents (38.29%) had completed primary school or lower, and 104 respondents (26.20%) had completed lower secondary school. Most respondents (283; 71.28%) reported a monthly income of 5,001–10,000 baht. In terms of occupation, 142 respondents (35.77%) were farmers and 81 (20.40%) were general laborers. Within this demographic context, household herbal use remained common among the respondents. In the past 1–2 months, 305 respondents (76.83%) reported using herbs for health care, whereas 92 respondents (23.17%) reported never using herbs. This information provides the descriptive context for understanding the specific herbal-use practices presented by health condition.

For gastrointestinal problems, the five herbal-use practices with the highest mean scores included consuming tamarind dipped in salt or drinking tamarind juice to relieve constipation ($\bar{x}$ = 2.71), consuming turmeric to relieve bloating, flatulence, indigestion, or gastritis ($\bar{x}$ = 2.56), consuming senna for constipation

($\bar{x}$ = 2.45), consuming raw bananas to relieve gastritis or mild diarrhea ($\bar{x}$ = 2.34), and consuming basil to relieve bloating, flatulence, and indigestion ($\bar{x}$ = 2.25). Overall, these findings indicate the continued use of local wisdom in supporting digestive health among older adults in the study area.

Table 2. General information about the sample (n = 397)

Characteristics	Number	Percentage
Sex		
- Male	125	31.49
- Female	272	68.51
Level of Education		
- Upper or Primary education	152	38.29
- Lower secondary school	104	26.20
- High school/Vocational Certificate	89	22.42
- Associate degree/Vocational Certificate level	43	10.83
- Bachelor's degree	8	2.02
- Upper Bachelor's degree	1	0.25
Average monthly income		
- Less than 5,000 baht/month	68	17.13
- 5,001 – 10,000 baht/month	283	71.28
- 10,001 – 15,000 baht/month	34	8.56
- More than 15,001 baht/month	12	3.02
Occupation		
- Retired civil servants	56	14.11
- Trader	79	19.90
- Agriculturist	142	35.77
- General employee	81	20.40
- Construction contractor	3	0.76
- Housewife/househusband or unemployed	36	9.07
In the past 1-2 months, have you used herbs to take care of your health?		
- ever	305	76.83
- never	92	23.17

Table 3 shows that household herbal use behaviors among older adults in Lampang Province varied by health condition. Herbs used for respiratory problems had the highest mean scores ($\bar{x}$ = 2.39–2.85). Using Indian gooseberry to relieve sore throat, cough, and phlegm had the highest mean score ($\bar{x}$ = 2.85, S.D. = 0.64). For digestive problems, commonly used herbs included tamarind dipped in salt for constipation ($\bar{x}$ = 2.71, S.D. = 0.64) and turmeric for stomach disorders ($\bar{x}$ = 2.56, S.D. = 0.63). Herb use for other conditions had the lowest mean scores ($\bar{x}$ = 1.75–1.94). Overall, these findings suggest that older adults selectively apply local knowledge in health care, focusing on familiar and effective herbs for common, everyday symptoms.

Table 3. The level of herbal use behavior in households of older adults in Lampung Province (n = 397)

information	Regularly (Percentage)	Sometimes (Percentage)	Never (Percentage)	Mean	S.D.
1. Gastrointestinal illnesses					
1.1 Herbs used to treat stomach diseases					
1.1.1 You can eat turmeric when you have symptoms of bloating, flatulence, tightness, colic, and stomach ailments.	86 (21.66)	235 (59.19)	76 (19.14)	2.56	0.63
1.1.2 You can eat raw bananas to treat stomach problems or mild diarrhea.	95 (23.93)	212 (53.40)	90 (22.67)	2.34	0.68
1.2 Herbs used to relieve symptoms of bloating, flatulence, and indigestion.					
1.2.1 You eat basil when you have symptoms of bloating, flatulence, and indigestion.	31 (7.81)	202 (50.88)	164 (41.31)	2.25	0.67
1.3 Herbs used to relieve constipation					
1.3.1 Do you eat tamarind with salt or tamarind juice when you are constipated?	43 (10.83)	248 (62.47)	106 (26.70)	2.71	0.64
1.3.2 You eat senna when you are constipated.	51 (12.85)	231 (58.19)	115 (28.97)	2.45	0.69
1.4 Herbs used to relieve diarrhea					
1.4.1 You eat raw guava when you have diarrhea.	32 (8.06)	131 (33.00)	234 (58.94)	1.38	0.58
1.4.2 You eat mangosteen peel when you have diarrhea.	6 (1.51)	165 (41.56)	226 (56.93)	1.27	0.57
2. Respiratory illnesses					
2.1 You can drink lemon juice when you have a sore throat, cough, or phlegm.	87 (21.91)	226 (56.93)	84 (21.16)	2.39	0.65
2.2 You eat Indian gooseberry when you have a sore throat, cough, or phlegm.	92 (23.17)	253 (63.73)	52 (13.10)	2.85	0.64
2.3 You take <i>Andrographis paniculata</i> when you have a sore throat, cough, or phlegm.	94 (23.68)	211 (53.15)	92 (23.17)	2.31	0.68

Table 3. The level of herbal use behavior in households of older adults in Lampang Province (n = 397)
(Cont.)

information	Regularly (Percentage)	Sometimes (Percentage)	Never (Percentage)	Mean	S.D.
3. Urinary tract illnesses					
3.1 You can drink lemongrass water when you have difficulty urinating or urinating.	42 (10.58)	193 (48.61)	162 (40.81)	2.17	0.69
3.2 You can eat roselle when you have urinary retention or difficulty urinating.	45 (11.34)	209 (52.64)	143 (36.02)	2.24	0.62
3.3 You eat thatch when you have difficulty urinating or difficulty urinating.	34 (8.56)	196 (49.37)	167 (42.07)	2.18	0.70
4. Skin-related illnesses					
4.1 You use aloe vera to treat burns and scalds.	89 (22.42)	231 (58.19)	77 (19.40)	2.52	0.69
4.2 You use Mahakan herb when you have boils or blisters.	54 (13.60)	182 (45.84)	161 (40.55)	2.01	0.69
4.3 You can use fresh garlic when you have a rash from insect bites.	48 (12.09)	171 (43.07)	178 (44.84)	1.98	0.66
4.4 You use Phaya Yo when you have herpes/shingles.	41 (10.33)	197 (49.62)	159 (40.05)	2.18	0.69
5. Other illnesses					
5.1 You ate bitter melon to cure and help with appetite.	32 (8.06)	167 (42.07)	198 (49.87)	1.75	0.61
5.2 You eat Cassia alata when you have insomnia.	34 (8.56)	156 (39.29)	207 (52.14)	1.94	0.59
5.3 You can use turmeric when you have pain, sprains, strains, or bruises.	43 (10.83)	165 (41.56)	189 (47.61)	1.86	0.63

This study extracted lessons learned from household herbal use among older adults in Lampang Province across four main dimensions. For gastrointestinal care, older adults demonstrated wisdom in selecting highly effective herbs that are readily available locally, particularly tamarind in various forms. The most common remedies for constipation were tamarind dipped in salt or tamarind juice ($\bar{x}$ = 2.71) and senna ($\bar{x}$ = 2.45), reflecting awareness of laxative components such as tartaric acid and malic acid. Turmeric was also used for gastrointestinal disorders ($\bar{x}$ = 2.56). For respiratory symptoms, older adults commonly used Indian gooseberry ($\bar{x}$ = 2.85), lemon juice ($\bar{x}$ = 2.39), and *Andrographis paniculata* ($\bar{x}$ = 2.31), consistent with Thai traditional medicine principles that classify and select herbs based on symptom severity. In urinary tract and skin care, specialized herbs were used selectively, such as roselle for urinary symptoms ($\bar{x}$ = 2.24) and aloe vera for burns ($\bar{x}$ = 2.52). Although most participants reported using herbs (76.83%), lower mean scores in some symptom groups ($\bar{x}$ = 1.75–1.94) suggest a transition between the persistence and possible loss of local wisdom. Overall, these findings highlight the importance of systematically recording and

preserving knowledge by developing a local herbal database, promoting intergenerational knowledge transfer, and integrating traditional wisdom with modern health systems

4. Discussion

The findings on household herbal use among older adults in Lampung Province revealed distinct patterns of local knowledge application that are consistent with knowledge management theories and traditional medicine frameworks. The integration of tacit and explicit knowledge in everyday herbal practices suggests that these indigenous health systems operate in a systematic and transferable way.

4.1 Behavioral Patterns and Knowledge Management Theory

The high mean score for herbal use in respiratory care, particularly Indian gooseberry ($\bar{x} = 2.85$), reflects the application of tacit knowledge embedded in community practice. This finding aligns with Nonaka and Takeuchi's SECI model (socialization, externalization, combination, and internalization), as discussed in contemporary knowledge management literature (Martínez-Martínez et al., 2021). The relatively low standard deviation (S.D. = 0.64) indicates consistent knowledge application across the study group, suggesting effective socialization processes through which tacit knowledge has been transmitted via observation and repeated practice. This consistency supports the view that, when tacit knowledge is reinforced through routine use and intergenerational transmission, it can remain stable even without formal documentation (Vrontis et al., 2022).

Similarly, the pattern of herbal use for gastrointestinal problems—particularly tamarind in various forms ($\bar{x} = 2.45$ – 2.71) and turmeric ($\bar{x} = 2.56$)—suggests nuanced decision-making based on symptom severity and preparation complexity. This adaptive use reflects what Lave & Wenger (2020) describe as “situated learning” within communities of practice, in which knowledge develops through contextual experience. The ability to adjust preparations according to the clinical presentation also reflects internalization in the SECI model, whereby explicit knowledge becomes tacit through practice (Martínez-Martínez et al., 2021). The relatively high mean score for turmeric may further indicate integration of traditional wisdom with scientific evidence regarding curcumin's anti-inflammatory properties (Amalraj et al., 2017; Kocaadam & Şanlıer, 2017), representing an evidence-informed traditional practice.

4.2 Knowledge System Complexity and Traditional Ecological Knowledge

The identification of four main dimensions of herbal knowledge, gastrointestinal, respiratory, urinary, and dermatological applications, illustrates the holistic and systematic nature of traditional medicine systems. This multidimensional structure aligns with Berkes (2017), who conceptualizes Traditional Ecological Knowledge (TEK) as a complex adaptive system integrating empirical observations, customary practices, and worldviews accumulated over generations. Participants' ability to classify herbs by target organ systems and therapeutic properties also reflects what Langeder et al. (2020) describe as “folk taxonomy”: systematic classification approaches that parallel biomedical categories while remaining grounded in experiential learning and cultural transmission.

The use of specific herbs for urinary and skin-related conditions, such as roselle ($\bar{x} = 2.24$) and aloe vera ($\bar{x} = 2.52$), reflects organ-specific therapeutic knowledge consistent with ethnopharmacological principles. This selective use also supports the concept of medical pluralism in health-seeking behavior, in which traditional and biomedical systems coexist and are chosen based on perceived appropriateness for specific conditions (Napier et al., 2014). In addition, practices related to seasonal availability and household preservation, observed in respiratory herb use, including Indian gooseberry, lemon juice ($\bar{x} = 2.39$), and *Andrographis paniculata* ($\bar{x} = 2.31$), suggest adaptive household resource management consistent with

sustainability-oriented approaches to medicinal plant production and utilization in Asian traditional medicine systems (Astutik et al., 2019).

4.3 Knowledge Erosion and Transmission Vulnerability

The notably lower mean scores in some symptom categories ($\bar{x} = 1.75\text{--}1.94$), particularly for urinary tract and skin-related care, raise concerns about knowledge erosion despite the overall high use rate (76.83%). This pattern is consistent with what Reyes-García et al. (2021) describe as erosion of traditional knowledge in local communities under modernization, urbanization, and declining intergenerational transmission. The selective loss also suggests that more specialized or less frequently used remedies are particularly vulnerable, consistent with the “use it or lose it” principle in cultural transmission theory (Koster et al., 2020).

This vulnerability can be interpreted through social learning theory, which emphasizes that cultural transmission requires not only exposure but also motivation, opportunity, and perceived relevance (Reyes-García et al., 2021). The shift toward modern healthcare may reduce opportunities for younger generations to observe and practice traditional herbal treatments, particularly for conditions perceived to require specialized care. In addition, the complexity of preparation methods for certain remedies may create barriers to learning, especially when expert knowledge is not readily accessible within households or community networks.

4.4 Integration with Health System Frameworks

The findings underscore the importance of integrating traditional herbal knowledge into formal health systems, consistent with the World Health Organization’s (2019) WHO Traditional Medicine Strategy 2014–2023, which emphasizes harnessing traditional medicine through evidence-based policy and practice. The demonstrated knowledge of herbal properties and appropriate applications provides a foundation for systematic documentation; however, such efforts must be carefully managed to prevent the risks of biopiracy and to protect the intellectual property rights of knowledge holders (Nordin et al., 2012).

The systematic patterns observed in this study also support the development of community-based knowledge management interventions. Such initiatives can draw on hybrid strategies that combine traditional oral transmission with modern documentation tools, ensuring both cultural authenticity and accessibility (Martínez-Martínez et al., 2021). For example, community-owned digital repositories, video documentation, and community herbal gardens may function as externalization mechanisms that help convert tacit knowledge into explicit forms while maintaining local ownership and control (Vrontis et al., 2022).

4.5 Implications for Sustainable Knowledge Preservation

Evidence of both knowledge retention and erosion highlights the need for systematic documentation and revitalization programs. In line with UNESCO frameworks for safeguarding intangible cultural heritage, such programs should prioritize active transmission over passive preservation, ensuring that knowledge remains a living practice rather than an archived artifact (Kurin, 2007). This approach also aligns with the concept of biocultural heritage, which recognizes the close relationship between biological diversity and cultural knowledge systems (Gavin et al., 2020).

The findings also suggest that effective knowledge management in traditional medicine requires attention to the social, cultural, and economic contexts that shape knowledge transmission. Interventions may focus on strengthening communities of practice, creating incentives for knowledge sharing, and incorporating traditional herbal knowledge into primary health care education. As recommended by Wanjohi et al. (2020), such multifaceted approaches can help ensure that Thailand’s

herbal heritage continues to contribute to health security while adapting to contemporary healthcare challenges.

In summary, household herbal knowledge among older adults in Lampang Province represents a sophisticated form of traditional ecological knowledge that shows both resilience and vulnerability. Systematic documentation, together with theory-informed interpretation of use patterns, provides a basis for culturally appropriate and scientifically informed knowledge management strategies that can preserve this heritage for future generations while supporting Thailand's health security objectives.

5. Conclusion

This mixed-methods study achieved its objectives by examining household herbal use behaviors and extracting lessons learned regarding knowledge management for older adults' health care in Lampang Province. The findings indicate clear patterns of herb use across health conditions and suggest that older adults possess substantial tacit knowledge embedded in everyday health practices.

The behavioral patterns observed indicate that household herb use among older adults in Lampang Province is condition-specific and adapted to symptom severity. For gastrointestinal problems, participants frequently used tamarind in various forms ($\bar{x}$ = 2.45–2.71) and turmeric ($\bar{x}$ = 2.56), reflecting the ability to select remedies for specific symptoms. Respiratory treatments also showed diverse local options, including Indian gooseberry ($\bar{x}$ = 2.85), lemon juice ($\bar{x}$ = 2.39), and *Andrographis paniculata* ($\bar{x}$ = 2.31), demonstrating a locally grounded repertoire for common respiratory symptoms.

The lessons learned highlight both strengths and vulnerabilities in local knowledge management. Although 76.83% of participants reported using herbs, lower mean scores in some symptom categories ($\bar{x}$ = 1.75–1.94), particularly for urinary tract and skin-related care, may indicate reduced use, shifting health practices, or gradual knowledge loss in these domains. This finding underscores the need for systematic documentation and strengthened intergenerational knowledge transfer.

The extracted knowledge suggests that older adults in Lampang Province retain practical herbal wisdom that supports day-to-day health care. Participants could identify medicinal properties, preparation methods, and appropriate uses of common household herbs such as ginger, *Andrographis paniculata*, turmeric, and garlic. However, differences in the level of use across health conditions also suggest that tacit knowledge transmission may be fragile in an aging society.

Overall, the findings support establishing systematic knowledge management frameworks to preserve household herbal knowledge as cultural heritage. Documenting patterns of herbal use and related knowledge provides a basis for interventions that strengthen intergenerational transfer, integrate traditional wisdom with modern health systems, and promote safe and accessible herbal practices. These efforts can contribute to Thailand's health security goals and help reduce healthcare costs among older adults.

6. Ethical Approval Statement

This study received ethical approval for research involving human participants from Sirindhorn College of Public Health. Approval was granted under research ethics code SCPHYLIRB-2567/316. The researcher ensured confidentiality and data protection throughout the study, including secure data management and restricted access to study records. Findings are reported in aggregate, and no personally identifiable information (e.g., names or other identifying details) is disclosed.

7. References

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