

Utilization of Herbal Medicines for Musculoskeletal Pain Relief Across Health Regions in Thailand: A Retrospective Study (2019-2023)

Aumpol Bunpean¹, Pattama Chantarapon², Natta Choedchutirakul^{1*} 

¹ Department of Thai Traditional Medicine, Kanchanabhishek Institute of Medical and Public Health Technology, Faculty of Public Health and Allied Health Sciences, Prabormarajchanok Institute, Ministry of Public Health, Nonthaburi, Thailand

² Songkhla Provincial Public Health Office, Songkhla, Thailand

Abstract

Background: Herbal remedies are prominent alternatives for managing muscle pain within Thai Traditional Medicine.

Objectives: To explore the utilization trends of herbal medicines for musculoskeletal pain relief across health regions and compare these utilization patterns among different health regions, in Thailand from 2019 to 2023.

Methods: This retrospective cross-sectional study utilized secondary data from Thailand's Health Data Center. Descriptive statistics identified the top 10 herbal medicines for pain relief in 2023. Trend analysis employed percentage change and compound annual growth rate (CAGR), while utilization share analysis was conducted across 13 health regions.

Results: In 2023, the most dispensed herbal medicine for pain relief was Phlai cream (23.69%), followed by Thaowan-Priang capsules (17.27%), Phlai ointment (16.80%), Phlai oil (16.31%), and herbal compresses (13.76%). Other medicines in the top 10 included Sahastara capsules, Chili gel, mixed Thaowan-Priang boluses, herbal poultices, and Cannabis oil (each < 6%). A 5-year trend analysis (2019-2023) indicated a shift toward topical applications; notably, Phlai cream (+4.59% CAGR) and herbal poultices (+97.16% CAGR) showed increases, while oral Thaowan-Priang capsules declined (-7.44% CAGR). Regional analysis revealed the highest utilization in Health Regions 8 and 9 (northeastern Thailand), whereas the lowest was observed in Health Region 13 (Bangkok metropolitan area).

Conclusions: A notable shift in the dispensing trends of herbal medicines for pain relief in Thailand was observed, particularly concerning Phlai products in external dosage forms. There were regional differences within Thailand in utilization of herbal medicine for pain relief. Regional analysis revealed that Health Regions 8 and 9 exhibited the highest utilization rates, whereas the lowest utilization was observed in Health Region 13.

Keywords: Herbal medicine, Musculoskeletal pain, Pain relief, Health regions, Thailand

Citation: Bunpean A, Chantarapon P, Choedchutirakul N. Utilization of herbal medicines for musculoskeletal pain relief across health regions in Thailand: a retrospective study (2019-2023). *Res Med J*. 20XX;XX(X):e279153. doi:10.33165/rmj.2027.e279153

*** Corresponding Author:**
natta@kmpht.ac.th

Received: 3 December 2025

Revised: 20 April 2026

Accepted: 21 April 2026

Published Online:
26 June 2026



Copyright © 2026
by the Author(s).

Licensee RMJ. This article is licensed under the Creative Commons Attribution (CC BY) License.

Introduction

Thai Traditional Medicine (TTM) has played a crucial role in the healthcare system of Thailand. Thailand's 20-Year National Health Strategy emphasizes the development of TTM services.¹ To implement these policies, the National Health Security Office established a fund for TTM to support Thai massage services and rehabilitation in 2007. In 2012, the national budget supported dispensing of herbal medicines on the National Essential Medicines List. From 2020 to the present, the expenses for traditional medicine services

have been managed as a per capita service fee. There is also support for herbal medicine dispensing and massage services according to a defined ceiling point system.² This support has led to increased public interest in traditional medicine services. Statistics from the fiscal years 2021, 2022, 2023, and 2024 show that there were 20.33 million, 24.60 million, 27.15 million, and 25.11 million outpatient visits for TTM, respectively.³

Musculoskeletal pain consistently ranks as one of the most common reasons for patients seeking TTM services. According to reports from the Ministry of Public Health, clinical diagnosis statistics for musculoskeletal disorders treated with TTM have shown a continuous and significant upward trend. The number of these service visits increased from 4 152 161 in 2022 to 5 352 107 in 2023, and reached 6 928 267 in 2024. This steady growth reflects the increasing popularity and public trust in TTM for the management of musculoskeletal conditions.⁴

Thailand has a long-standing tradition of utilizing herbal medicines for pain relief, with extensive evidence documented in recognized Thai traditional treatises. Key oral formulations include Thaowan-Priang (*Derris scandens*), Sahastara herbal formula and Thoraneesanthakat herbal formula, while external applications feature Phlai (*Zingiber montanum*) in cream and oil forms, Chili (*Capsicum annuum*) gel, herbal poultices, and herbal compresses. These herbal medicines can help reduce the use of chemically formulated drugs, which may have long-term side effects.

To formalize their clinical use, the Ministry of Public Health integrated these herbal medicines into the National List of Essential Medicines for musculoskeletal treatment. Consequently, these medicines are distributed and utilized across all health regions nationwide. Nevertheless, the patterns of utilization and preferences for specific herbs may vary significantly, influenced by regional contexts, socioeconomic factors, and the unique demographic characteristics of each health district.⁵

Therefore, more data about the use of herbs for pain relief can inform the development of health policies that prioritize the utilization of Thai herbs within a holistic treatment plan. This approach may help patients reduce their dependence on conventional medications. Conventional medications can be complex and may have adverse side effects, particularly for the elderly and individuals with chronic illnesses who are unable to take chemically manufactured medications.⁶

Despite national policies promoting the integration of Thai herbal medicine into healthcare services, a critical gap remains in longitudinal data regarding actual dispensing patterns. This lack of real-world evidence hinders the evaluation of health policy effectiveness and the identification of underperforming areas in herbal medicine utilization. To address this gap, this study investigated the patterns of herbal medicine dispensing for pain management in Thailand between 2019 and 2023. The findings of this study will help establish a valuable database for analyzing trends in herbal medicine use among the Thai population. This information can be used to develop health policies that meet public needs and to raise awareness about the effectiveness of Thai herbs in pain management.

Methods

This study consisted of descriptive research using secondary data collected from the Health Data Center (HDC) of Thailand. The study population included all Government Health Service registered with the Office of Policy and Strategy, Ministry of Public Health. Data extraction and reporting were conducted on 1 January 2025.

Data Collection and Analysis

This retrospective study utilized secondary data obtained from the HDC of the Ministry of Public Health, Thailand. The data collection process was conducted as follows: 1) data were accessed through the official HDC portal by the research team in accordance with institutional security protocols; 2) the dataset encompassed all health service units registered under the Office of Policy and Strategy, Ministry of Public Health, covering all 77 provinces across 13 health regions; 3) to ensure accuracy, 3 certified TTM practitioners served as experts to screen and validate the list of herbal medications. They identified and categorized medicines specifically for their pain-relieving properties based on their composition and dosage forms; and 4) the raw data underwent a validation process to remove duplicate entries and incomplete records. The experts cross-referenced the identified medications with the National Essential Herbal Medicine List to ensure methodological rigor.

Statistical Analysis

To comprehensively examine dispensing patterns and temporal trends from 2019 to 2023, the data were analyzed using 2 main statistical approaches.

Descriptive statistics were applied to summarize the data, including frequency, total dispensing instances, and percentages, in order to identify the top 10 herbal medicines used for pain relief in the year 2023.

Temporal trend analysis was conducted to examine changes in dispensing patterns over time. This analysis included the calculation of percentage change to determine the annual growth or decline in specific herbal medicines. Compound annual growth rate (CAGR) was calculated using the formula: $CAGR (\%) = [(V_{final}/V_{begin})^{1/n} - 1] \times 100$, where V_{begin} is number of times the herbal medication was dispensed in fiscal year 2019, V_{final} is number of times the herbal medication was dispensed in fiscal year 2023, n is number of years between the beginning and final years in the formula.

The CAGR was calculated for the 5-year period (2019-2023) to estimate the average annual growth rate of external preparations compared with oral preparations. Utilization share analysis was also performed to assess the relative popularity of each medicine based on its proportion of the total top 10 herbal dispensations. Regional variation analysis across the 13 health regions was conducted to identify geographical trends in usage of herbal medicines for pain relief and specific population needs for pain relief.

Results

The top 10 most frequently dispensed herbal medicines for pain relief in Thailand during fiscal year 2023 were classified into 2 groups: external and internal use medications (Table 1). For external use medications, Phlai cream was the most dispensed, with 1 408 019 dispensations (23.69%), followed by Phlai ointment (998 953 [16.80%]), Phlai oil (969 434 [16.31%]), and herbal compresses (817 741 [13.76%]). The remaining external preparations, including Chili gel (181 554 [3.05%]), herbal poultices (43 971 [0.74%]), and Cannabis oil (*Cannabis sativa*; 39 566 [0.67%]), each accounted for less than 6% of total dispensations. Regarding internal use medications, Thaowan-Priang capsules were the most dispensed (1 026 533 [17.27%]), followed by Sahastara capsules (313 380 [5.27%]) and mixed Thaowan-Priang extract boluses (145 400 [2.45%]).

When comparing the distribution of herbal medicines for pain relief across health regions in Thailand for the fiscal year 2023, we observed that each region had distinct trends

in herbal medicine used, depending on the needs and characteristics of the population in the area. Health Region 8 (utilization share 15.72%) and 9 (utilization share 14.35%), which are located in northeastern Thailand, had the highest distribution of herbal medicines, utilizing a wider variety of these medicines compared to other regions. Phlai cream and Thaowan-Priang capsules were identified as the most widely used herbal medicines in these region, indicating a high demand for herbal remedies for pain relief and inflammation among the population. Health Region 10 (utilization share 12.22%), which is also located in northeastern Thailand, had the highest distribution of Phlai ointment, with 255 627 instances, which is used for treating muscle and joint pain. This region may have had a higher number of individuals with musculoskeletal issues compared to other areas. In contrast, Health Region 13 (utilization share 0.73%), which represents the Bangkok metropolitan area, exhibited the lowest distribution of herbal medicines, particularly for Thaowan-Priang capsule, which was not dispensed at all. This could be attributed to low demand or limited accessibility to these medicines in the region. Health Regions 7 (utilization share 11.00%) and 8 (utilization share 15.72%), which are located in northeastern Thailand, exhibited the highest utilization of herbal compress, with Health Region 7 distributing it 155 042 times. The prevalence of herbal compress indicates the acceptance of traditional Thai treatment methods for pain relief and improved blood circulation. Additionally, Health Region 6 (utilization share 7.15%), which is located in eastern Thailand, used Chili gel 19 651 times, suggesting the use of heat-based remedies for pain relief in this area.

An analysis of herbal medicine types revealed Phlai cream as the most widely distributed, with a total of 1 408 019 instances, indicating its popularity for pain relief and inflammation reduction. Health Regions 9 and 8 exhibited the highest usage of Phlai cream. Thaowan-Priang capsule followed with a total of 1 026 533 distributions, led by Health Region 8. Phlai ointment and Phlai oil were also extensively distributed, demonstrating a preference for Phlai in various forms to address symptoms and user preferences. The herbal compress had a total distribution of 817 741 times, with Health Region 7, which is located in northeastern Thailand, leading in usage. Cannabis oil had the lowest distribution, totaling 39 566 instances, primarily in Health Region 8. This reflects the limited availability of cannabis oil compared to other herbal medicines.

Table 1. Top 10 Herbal Medicines for Pain Relief With the Highest Number of Dispensations in Thailand for the Fiscal Year 2023

Herbal Medicine Name	Number of Dispensation, Time	Utilization Share, %
Phlai (<i>Zingiber montanum</i> , cream)	1 408 019	23.69
Thaowan-Priang (<i>Derris scandens</i> , capsule)	1 026 533	17.27
Phlai (<i>Zingiber montanum</i> , ointment)	998 953	16.80
Phlai (<i>Zingiber montanum</i> , oil)	969 434	16.31
Herbal compress	817 741	13.76
Sahastara recipe (capsule)	313 380	5.27
Chili (<i>Capsicum annum</i> , gel)	181 554	3.05
Mixed-Thaowan-Priang extract (<i>Derris scandens</i> , bolus)	145 400	2.45
Herbal poultice	43 971	0.74
Cannabis (<i>Cannabis sativa</i> , oil)	39 566	0.67

Overall, the data revealed that herbal medicine usage varied across health regions, influenced by the type of herbal medicine and the specific needs of each population. Phlai cream and Thaowan-Priang capsule were the most widely distributed in several health regions, suggesting their popularity for pain and inflammation relief. Conversely, Cannabis oil exhibited the lowest distribution, potentially due to legal restrictions and usage control. Each health region also demonstrated distinct trends in herbal medicine use, reflecting the specific needs of the population in the area (Table 2).

A 5-year visualization of dispensing trends for each herbal medicine revealed that Phlai cream maintained a consistently high level of annual dispensing, peaking in 2023 at 1 408 019 instances. This reflects steady growth, with a CAGR of 4.59%, highlighting its sustained popularity for relieving pain and inflammation. Similarly, Phlai ointment and Phlai oil demonstrated upward trajectories, with CAGRs of 3.54% and 4.58%, respectively, indicating a robust shift toward various topical forms of Phlai.

In contrast, Thaowan-Priang capsules experienced a continuous decline following their peak in 2020 (1 435 502 instances), dropping to 1 026 533 instances in 2023. This marked downturn is reflected in a negative CAGR of -7.44%, suggesting a shift toward alternative medications. Other traditional remedies also showed downward trends, including Sahastara recipe capsules (-2.63% CAGR), herbal compresses (-2.29% CAGR), and mixed Thaowan-Priang extract boluses (-3.12% CAGR). Meanwhile, Chili gel remained relatively stable throughout the period (-0.47% CAGR).

Notably, 2 emerging treatments showed exceptional growth. Herbal poultice demonstrated a sharp increase in 2023, reaching 43 971 instances, resulting in a remarkable 5-year CAGR of 97.16%. Furthermore, Cannabis oil has shown a consistent upward trend since 2020. When calculated over a 4-year period (2020-2023) to account for its initial legal introduction, Cannabis oil achieved a CAGR of 42.66%, reflecting rapidly increasing clinical acceptance and accessibility within the Thai healthcare system (Table 3).

Table 2. Comparing Dispensing Frequencies of Herbal Medicine for Pain Relief in Each Health Region of Thailand, Fiscal Year 2023

Health Region	Number of Times That Medicine Was Dispensed										Utilization Share, %
	Phlai (Cream)	Thaowan-Priang (Capsule)	Phlai (Ointment)	Phlai (Oil)	Herbal Compress	Sahastara Recipe (Capsule)	Chili (Gel)	Mixed-Thaowan-Priang Extract (Bolus)	Herbal Poultice	Cannabis (Oil)	
1	106 475	51 263	237 209	16 207	77 730	27 193	42	6684	459	2072	8.84
2	87 820	42 126	82 489	31 240	26 324	11 902	8607	6333	459	2288	5.04
3	26 744	69 165	8083	79 505	22 746	14 258	3556	13 393	259	4453	4.07
4	61 343	48 457	14 789	9415	15 241	21 265	20 714	638	45	2123	3.26
5	132 222	65 200	12 535	29 664	16 736	15 915	28 123	893	1097	2891	5.14
6	148 235	53 567	16 898	75 050	52 975	25 291	19 651	2316	29 221	1996	7.15
7	94 472	103 862	138 314	77 458	155 042	38 035	34 624	3990	5516	2357	11.00
8	232 965	195 364	150 652	111 306	151 892	45 710	7143	31 133	272	8156	15.72
9	233 518	131 554	106 077	135 193	111 510	59 378	11 690	54 553	4235	5183	14.35
10	130 212	67 434	103 715	255 627	131 676	8585	12 405	12 015	1830	2646	12.22
11	51 999	98 918	62 884	22 397	16 076	19 566	15 664	3842	30	3641	4.96
12	77 382	99 623	65 306	124 558	33 811	26 272	8210	9610	548	1746	7.52
13	24 632	0	2	1814	5982	10	11 125	0	0	14	0.73
Total	1 408 019	1 026 533	998 953	969 434	817 741	313 380	181 554	145 400	43 971	39 566	100.00

Table 3. Trend of Dispensing Frequencies for Herbal Medicines for Pain Relief in Thailand Over the Past 5 Years (Fiscal Year 2019-2023)

Herbal Medicine Name	Number of Times That Medicine Was Dispensed					
	2019	2020	2021	2022	2023	CAGR
Phlai (cream)	1 176 545	1 116 366	1 043 017	1 040 591	1 408 019	+4.59
Thaowan-Priang (capsule)	1 399 312	1 435 502	1 230 651	1 035 797	1 026 533	-7.44
Phlai (ointment)	869 288	860 239	822 387	856 836	998 953	+3.54
Phlai (oil)	810 518	889 875	868 900	863 331	969 434	+4.58
Herbal compress	897 152	854 480	741 416	783 740	817 741	-2.29
Sahastara recipe (capsule)	348 618	349 215	288 795	267 500	313 380	-2.63
Chili (gel)	193 684	195 268	178 710	169 922	181 554	-0.47
Mixed-Thaowan-Priang extract (bolus)	165 045	166 946	164 396	155 217	145 400	-3.12
Herbal poultice	2884	7451	6353	8658	43 971	+97.16
Cannabis (oil)	NA	13 626	25 098	32 143	39 566	+42.66*

Abbreviation: CAGR, compound annual growth rate.

* CAGR for cannabis oil is calculated over a 4-year period (2020-2023), as data recording commenced in 2020.

Discussion

Utilization Trends of Herbal Medicines for Musculoskeletal Pain Relief

Based on data from the Health Data Center of Thailand for the number of times that herbal medication was dispensed during 2023, the most popular product was Phlai cream, which was dispensed 1 408 019 times. Meanwhile, Phlai ointment and Phlai oil ranked third and fourth, with 998 953 and 969 434 dispensations, respectively. This indicates the widespread use of Phlai for external application to relieve muscle and joint pain and inflammation. Its popularity may have stemmed from the recognized effectiveness of Phlai in alleviating pain and inflammation among the general public.⁷⁻⁹ Considering the various usage forms, such as cream, ointment, and oil, the data we examined revealed that the cream form was the most popular for patients. We hypothesize that patients preferred the cream formulation because it was easy to wash off and could be applied directly to the site of pain. Thus, the cream became the preferred option for those seeking convenient and immediate relief.¹⁰ This aligns with the study by Bunpean et al¹¹ which found that Phlai effectively alleviates muscle pain, especially for local applications.

Meanwhile, Thaowan-Priang capsule followed in second place with 1 026 533 instances dispensed, while the mixed-Thaowan-Priang extract bolus format ranked eighth with 145 400 instances. This highlights the notable role of oral Thaowan-Priang medications in treating pain and inflammation. Thaowan-Priang effectively alleviates muscle pain, comparable to nonsteroidal anti-inflammatory drugs.^{12,13} Additionally, it has been included in the national essential medicines list for herbal medicines.⁵ The capsule form is preferred over the granule form because capsules are easier to swallow. Capsules are suitable for all user groups, including the elderly or those with chewing or swallowing difficulties. They are a better option for many, as they can be swallowed directly without complicated preparation or mixing; they also do not have flavors or odors that might make users uncomfortable.¹⁴ This aligns with the study by Benjakun et al,¹⁵ which found that taking Thaowan-Priang for 7 consecutive days was effective and safe for treating knee pain associated with arthritis, with results comparable to ibuprofen treatment.

While Cannabis oil, with only 39 566 dispensations, was less frequently used, the study data indicated a growing trend in the use of *Cannabis sativa* for pain relief. This emerging popularity stemmed from the plant's pain-relieving and anti-inflammatory effects.¹⁶ The fact that Cannabis oil ranked among the top 10 reflects its acceptance and growing demand for use in pain relief among certain population groups. This trend aligned with Thailand's cannabis legalization policy, which permitted medical cannabis use since 2019 following the enactment of the Narcotics Act (No. 7), A.D. 2019.¹⁷ This study's findings were consistent with a meta-analysis of various forms of cannabis for overall pain, which found that cannabis was effective for pain relief, particularly for neuropathic pain.¹⁸ While the distribution of prescribed Cannabis oil has increased, its prescription remains restricted to TTM practitioners and specialized physicians. Furthermore, between 2020 and 2022, the COVID-19 pandemic necessitated national lockdowns, potentially hindering patients' ability to access consistent hospital-based medication.

Overall, the findings from this study indicated that herbal medicines for pain relief continued to play a vital role in Thailand. We inferred that patients selected certain herbal medications and particular forms due to various factors, such as ease of use, effectiveness, and accessibility. This information can be utilized for planning herbal medicine research and development as well as for developing public health policies to effectively promote the use of herbal medicines in local communities.

Comparison of Utilization Patterns Among Different Health Regions in Thailand

Health Regions 8 and 9 had the highest proportions of herbal medicine prescriptions for pain relief compared to other health regions. In particular, Phlai cream and Thaowan-Priang capsules for pain relief were very popular compared to other regions in Thailand. However, Health Region 10 had the largest dispensing of Phlai oil for topical application; this finding indicated a higher demand for medications to address joint and muscular pain in this region. Health Regions 7 and 8 also had the highest usage of herbal compress, especially in Health Region 7, which recorded 155 042 prescriptions.

Considering the social and economic conditions in different regions in Thailand, this study note that Health Regions 7 through 10 were located in the northeastern region of Thailand. In northeastern Thailand, a majority of the population works in agriculture and labor-intensive activities such as rice cultivation, animal husbandry, or factory work.¹⁹ These types of jobs typically involve repetitive movements, heavy lifting, and improper postures, which can easily lead to muscle pain.

In contrast, Health Region 13, which comprises of the Bangkok metropolitan area, had the lowest number of herbal medicine prescriptions for pain relief, particularly for Thaowan-Priang capsule, which was not prescribed at all. This may have resulted from lower demand in the area, as Health Region 13 covers a highly urbanized and industrialized area, where access to modern medicine was more convenient and prevalent than TTM. Moreover, the majority of the population is generally more familiar with and trusts modern medicine, leading to a decrease in the popularity of herbal medicines compared to more remote areas. This study's findings were consistent with data from the preliminary report of the Ministry of Public Health, which found that in the fiscal year 2022, Health Region 13 had the fewest herbal medicine prescriptions compared to other health regions.²⁰

Data on herbal medicine prescriptions from 2019 to 2023 showed various trends reflecting the changing popularity of herbal medicines.

There was a trend showing increased use of external-use medications, including Phlai cream, Phlai ointment, Cannabis oil, and herbal poultices. In contrast, oral medications such as Thaowan-Priang capsule, Sahastara recipe capsule, and mixed-Thaowan-Priang extract bolus showed a decreasing trend. One reason for these findings may have been growing patient preference for the convenience of external medications, which could be applied directly to the painful area. These medications allow the patient to avoid side effects associated with oral medications, such as stomach problems or inconsistent absorption. Additionally, topical medications were suitable for localized relief, leading users to perceive them as more effective and safer for everyday use.^{21, 22}

Herbal compress, even though used externally, showed a downward tendency. This may have been due to the popularity of more convenient products, such as creams or gels, which can be applied directly to painful areas. Herbal compress often involves cumbersome application processes, leading to a decreased trend in usage compared to other forms of external medications that are easier to use.²³

Herbal medicines with stable dispensing trends included Chili gel and Phlai oil. Both of these medicines showed consistent use over the past years, reflecting ongoing popularity and acceptance for treating localized pain. Specifically, Chili gel contains capsaicin, which helps relieve pain.²⁴ The stable usage of Chili gel demonstrated user confidence in products that provide localized pain relief, especially when oral medication was not preferred. Phlai oil contains active components such as (*E*)-1-(3',4';-dimethoxyphenyl) butadiene.⁹ It continued to be widely used, indicating its acceptance for relieving pain and treating inflammation through localized application. Phlai oil was a good option for those who wanted to avoid taking oral treatments and preferred to utilize external products.

This study provided an overview of the changing trends in herbal medicine use. These findings provide clear information to entrepreneurs designing future herbal medicine. This findings suggest that herbal medicine companies should adjust their marketing strategies to align with the growing consumer demand for external herbal medicines. This study also informs medical practitioners about usage trends across different categories of herbal medicines for pain relief. Hopefully, this data can help promote safe, effective use of herbal medicines for pain relief within a safer and more effective the Thai healthcare system.

This study has some limitations. First, the data are based on secondary records from the HDC, which may be subject to regional coding inconsistencies. Second, the study focuses on dispensing frequency and does not account for clinical outcomes or patient satisfaction. Lastly, it primarily covers the public health sector, potentially excluding private clinic trends.

Conclusions

An overview of the top 10 herbal medicines dispensed for pain relief in Thailand highlighted that Phlai products particularly creams, ointments, and oils as the most widely used for reducing pain and inflammation. Thaowan-Priang also showed substantial usage, especially in capsule form. This study's analysis of dispensing trends between 2019 and 2023 suggests a clear preference for external preparations over oral medications, reflecting a transition in clinical practice and shift in the overall utilization pattern toward localized, nonsystemic treatments. Regional analysis revealed distinct variations in utilization patterns across the country. The highest levels of herbal medicine dispensing were observed in Health Regions 8 and 9, whereas the lowest utilization was recorded in Health Region 13 (Bangkok). These disparities likely reflect differences in lifestyle and

primary occupations between regions. Specifically, the higher demand in Health Regions 8 and 9 may be driven by the predominantly agricultural workforce, whose physically demanding labor leads to a greater reliance on herbal remedies for muscle pain. In contrast, the lower usage in Bangkok (Health Region 13) reflects an urbanized society with different healthcare-seeking behaviors and greater access to modern medical facilities. Trends over the past 5 years reveal fluctuating demand for each herbal medicine, reflecting shifts in legal and societal acceptance. These insights could inform future efforts to support the promotion of effective herbal pain relief treatments tailored to regional demands.

Additional Information

Acknowledgments: We sincerely thank the Health Data Center and the Bureau of Policy and Strategy, Ministry of Public Health, Thailand, for their invaluable support in providing the data sources utilized in this study.

Ethics Approval: This study received ethical approval from the research ethics committee of Kanchanabhishek Institute of Medical and Public Health Technology, Faculty of Public Health and Allied Health Sciences, Praboromarajchanok Institute (KMPHT-67010016 on 23 December 2024).

Clinical Trial Consideration: This study was not a clinical trial.

Financial Support: This study received no external financial support/funding.

Conflict of Interest: The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

Author Contributions:

Conceptualization: All authors

Formal Analysis: Pattama Chantarapon

Investigation: Pattama Chantarapon

Methodology: Aumpol Bunpean

Validation: Aumpol Bunpean

Writing – Original Draft: Aumpol Bunpean

Writing – Review & Editing: Natta Choedchutirakul

References

1. Department of Thai Traditional and Alternative Medicine, Ministry of Public Health. *Five-Year Strategic Plan (2023-2027)*. Department of Thai Traditional and Alternative Medicine, Ministry of Public Health; 2022. Accessed 15 March 2026. <https://www.dtam.moph.go.th/dtam-action-plan>
2. National Health Security Office. *National Health Security Fund Management Manual for Fiscal Year 2021*. Sahamit Printing and Publishing; 2020. Accessed 15 March 2026. https://e-library.nhso.go.th/assets/portals/1/ebookcategory/21_FundManual64/FundManual64
3. Department of Thai Traditional and Alternative Medicine, Ministry of Public Health. *Health Profile 2021-2024: Regarding Thai Traditional Medicine, Folk Medicine, and Alternative Medicine*. Department of Thai Traditional and Alternative Medicine, Ministry of Public Health; 2025. Accessed 15 March 2026. <https://www.dtam.moph.go.th/publications/32886>

4. Bunpean A. Muscle pain in Lom Plai Pattakhat disease: an in-depth perspective in Thai traditional medicine. *Journal of Medical Technology and Allied Health Sciences*. 2025;1(1):e2846.
5. Herbal Product Division, Food and Drug Administration. *National List of Essential Medicines: Herbal Medicines B.E. 2566*. Minnie Group Co, Ltd; 2023. Accessed 15 March 2026. https://herbalexpertbymayuree.com/ebook/ebook_1701924960.pdf
6. Sinpaiboonlert O, Liang D, Buranatawonsom T, Chitrathivat P. Treating chronic knee pain in the elderly without using pain relievers in modern medicine and alternative medicine. *Multidisciplinary Journal of Shinawatra University*. 2024;1(1):16-26.
7. Pitiporn S. *Record 5 of Herbs: Compress, Steam, Bath, Massage*. Chao Phraya Abhaibhubejhr Hospital Foundation; 2012:100-106.
8. Subcommittee on the Preparation of Monographs of Selected Thai Materia Medica. Monograph of selected Thai materia medica: PHLAI. *Journal of Thai Traditional & Alternative Medicine*. 2012;10(1):52-56.
9. Temsiririrkkul R, Chuakul W, Wongkrajang Y, et al. *Knowledge from Research on 10 Thai Herbal Plants: Black Turmeric, White Vine, Turmeric, Ginger, Centella, Pepper, Phlai, Andrographis Paniculata, Amla, and Bitter Gourd*. 21 Century Company; 2007:135-149.
10. Bani KS, Bhardwaj K. Topical drug delivery therapeutics, drug absorption and penetration enhancement techniques. *Journal of Drug Delivery and Therapeutics*. 2021;11(4):105-110. doi:10.22270/jddt.v11i4.4864
11. Bunpean A, Chantrarapon P, Choedchuthirakul V. Effectiveness of herbal ball oil and palm oil massage on neck and shoulder pain in students of Kanchanabhishek Institute of medical and public health technology. *Koch Cha Sarn Journal of Science*. 2018;41(1):57-68.
12. Srimongkol Y, Warachit P, Chavalittumrong P, et al. A study of the efficacy of *Derris scandens* (Roxb.) Benth. extract compared with diclofenac for the alleviation of low back pain. *Journal of Thai Traditional & Alternative Medicine*. 2007;5(1):17-23.
13. Phimarn W, Caichompoo W, Sungthong B, Saramunee K. A systematic review and meta-analysis on effectiveness of *Cissus quadrangularis* (Linn.) in hemorrhoid treatment. *Isan Journal of Pharmaceutical Sciences*. 2014;10(3):403-418. doi:10.14456/ijps.2014.30
14. The United States Pharmacopeial Convention. *The United States Pharmacopeia 2020 (USP 43) and The National Formulary (NF 38): Volume 1*. The United States Pharmacopeial Convention; 2020. Accessed 15 March 2026. <http://182.160.97.198:8080/xmlui/handle/123456789/1493>
15. Benchakanta S, Puttiwong S, Boontan N, Wichit M, Wapee S, Kansombud S. A comparison of efficacy and side effects of knee osteoarthritis treatments with crude *Derris scandens* and ibuprofen. *Journal of Thai Traditional and Alternative Medicine*. 2012;10(2):115-123.
16. Radapong S, Suppajariyawat P, Phadungkit M. Pharmacological effects and toxicity of cannabis. *Bulletin of the Department of Medical Sciences*. 2021;63(1):219-232.
17. *The Narcotics Act (No. 7) B.E. 2562 (A.D. 2019)*. Royal Thai Government Gazette. 2019;136(19A):1-16. Published 18 February 2019. Accessed 15 March 2026. <https://ratchakittha.soc.go.th/documents/17072208.pdf>
18. Whiting PF, Wolff RF, Deshpande S, et al. Cannabinoids for medical use: a systematic review and meta-analysis. *JAMA*. 2015;313(24):2456-2473. doi:10.1001/jama.2015.6358
19. National Statistical Office. Agricultural Census. National Statistical Office; 2023. Accessed 15 March 2026. https://www.nso.go.th/nsoweb/main/summano/P7?set_lang=en#gsc.tab=0
20. Health KPI, Ministry of Public Health. Indicator 055.2: The Value of Herbal Medicine Usage in Provincial Health Districts. Health KPI, Ministry of Public Health; 2023. Accessed 15 March 2026. <http://healthkpi.moph.go.th/kpi2/kpi/index/?id=1936>
21. Derry S, Wiffen PJ, Kalso EA, et al. Topical analgesics for acute and chronic pain in adults - an overview of Cochrane reviews. *Cochrane Database Syst Rev*. 2017;5(5):CD008609. doi:10.1002/14651858.CD008609.pub2

22. Li CL, Huang HL, Wang WC, Hua H. Efficacy and safety of topical herbal medicine treatment on recurrent aphthous stomatitis: a systematic review. *Drug Des Devel Ther.* 2015;10:107-115. doi:10.2147/DDDT.S96589
23. Sriprasert S, Thianpaisan S. *Innovation of Herbal Compress: Development and Standardization*. Faculty of Pharmacy, Mahidol University; 2013. Accessed 15 March 2026. <https://pharmacy.mahidol.ac.th/newspdf/specialproject/2556-06.pdf>
24. Kulkantrakorn K, Lorsuwansiri C, Meesawatsom P. 0.025% capsaicin gel for the treatment of painful diabetic neuropathy: a randomized, double-blind, crossover, placebo-controlled trial. *Pain Pract.* 2013;13(6):497-503. doi:10.1111/papr.12013

Article in Press