



Local Wisdom and Medicinal Plant Utilization of Certified Folk Healers for Therapeutic Purposes in Buriram Province, Thailand

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ARTICLE INFO

Article history:

Received 30 January 2021

Revised 26 March 2021

Accepted 17 April 2021

Published online 03 May 2021

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ABSTRACT

Folk healers used medicinal plants to treat diseases for ages. Due to the development of modern medicine, the local wisdom of folk healers is declining regarding the use of medicinal plants in treating diseases. Therefore, ancestral knowledge has to be systematically documented. This study was performed using a mixed-method study, which comprised the following: a qualitative approach through a face-to-face open-ended interview using a semistructured questionnaire; identification and classification of medicinal plants used by different ethnic group folk healers in Buriram Province, Thailand. For the interview, all participants were male folk healers aged over 50 years. All healers believed that the human body is made up of four elements: earth, water, wind, and fire. Illness or disease results from an imbalance of the four elements. The results showed that folk healers used 220 medicinal plants from 76 families for therapeutic purposes. The top three families were Fabaceae, Euphorbiaceae, and Poaceae, respectively. Moreover, the most commonly used parts were root (26.1%), aerial stem (23.5%), and tuber/bulb (13.2%). Most herbal remedies were administered orally (84.62%). The top three most important plants with a use value index of 0.64 were *Walsura villosa*, *Piper nigrum*, and *Smilax glabra*. The most treated diseases and symptoms were gastrointestinal disorders (16.07%), cancer (10.71%), and respiratory conditions (9.82%). In conclusion, the uses of medicinal plants and practice patterns of folk healers were systematically documented. Verification of bioactive compounds, chemical profiling *in vitro* and *in vivo*, and/or clinical studies of the medicinal plants are required to confirm the efficacy.

Keyword: Ethnobotany, Ethnomedicine, Medicinal plants, Oblation, Traditional uses, Use value index.

Introduction

Human sustenance relies on natural resources. Plants are considered a critical resource for living activities, as humans use them for food, medicine, housing, and clothing. Their utilization requires knowledge and experience passed down from the past generations to the present one. In terms of therapeutic purposes, it is important to identify medicinal plants used by folk healers to discover new and potential drug candidates.¹ Nowadays, resources are being used more than necessary, resulting in encroachment of forest areas. Thailand is one of the countries facing the problem of plant resources depletion. A survey found that the forest area in Thailand is approximately 31.58% of the country's total land area, and the northeast has only 14.94 % of the forest area.² Reduction of forest areas inevitably leads to loss of ecological diversity and vegetation habitat.

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Citation: Neangthaisong T, Rattanakiat S, Phimarn W, Joeprakhon S, Saramunee K, Sunghong B. Local Wisdom and Medicinal Plant Utilization of Certified Folk Healers for Therapeutic Purposes in Buriram Province, Thailand. Trop J Nat Prod Res. 2021; 5(4):678-685. doi.org/10.26538/tjnpr/v5i4.15

Official Journal of Natural Product Research Group, Faculty of Pharmacy, University of Benin, Benin City,

Biodiversity reduction may cause a decrease in Nigeria ecosystem services and eventually poses a significant danger for sustenance security and also for humankind.

Isan is the northeast region of Thailand. This region encompasses diverse arts, cultures, and traditions, which differ among localities. More than 20 ethnic groups are scattered throughout the Isan area. Based on ethnolinguistic diversity, Thai Isan or Thai Lao people make up the majority of the population in this region, who speak a language categorized under the Tai-Kadai language family. Buriram, a province in Isan, has four ethnic indigenous groups, namely: (1) Thai Isan or Thai Lao group; (2) Thai Korat group belonging to Tai-Kadai language family; (3) Thai Khmer group; (4) Thai Kuy group belonging to the Mon-Khmer language family. In addition to language being an important indicator of ethnic differences, their unique ways of living and culture are also key to differentiating between ethnic groups.³

As a part of the cultural aspect, local wisdom holds a highly respected place in communities of all sizes throughout Thailand, employing knowledge and traditions that are faithfully passed down from generation to generation and are applied in various areas of everyday life, including health and wellness. The folk healer is a primary source of healthcare for Thai people, especially in rural areas, which is consistent with Thailand's policy that focuses on people taking care of their own health.

The paradigm for Thai national health policy, the Tenth National Health Development Plan (2007–2011), has shifted to a community-based approach, focusing on providing care responsive to people's

needs. Local wisdom and existing health resources, including traditional healers, are recognized as important resources in healthcare. They have been incorporated into the National Health Act as a guideline for the drafting and practice of health policy.⁴ Traditional healers in Thailand have been formally accepted as a primary healthcare (PHC) resource since the late nineteenth century. Today, they still have an active role in the health of Thais. A previous survey in 2006 across 75 provinces that the total number of traditional healers is 27,760. The northeast region had the highest number, with 14,146 practitioners. Traditional healers specialize in different areas of health and their specialization often overlaps with others so that they can effectively deal with many types of illnesses. For example, some herbalists, called *mor sa moon prai*, not only specialize in *tom ya sa moon prai* (stewed herbal medicine), but also practice the skills of *mor du* (fortune teller), *mor nuat* (massage healer), and *mor wai phom* (ceremonial healer or faith healer).

The folk healthcare sector is recognized as a cultural healthcare system based on a holistic healthcare paradigm. Accordingly, it defines healthy people as those who have achieved balance in the physical, mental, social, and spiritual dimensions. Hence, healing strategies are concerned with methods to cure disorders or symptoms and strategies to maintain the balance between these four dimensions. Healing strategies aim to connect the community, environment, and supernatural powers to holistically improve an individual's health. However, the use of herbs is a core part of traditional medicine. The principles and knowledge of folk healing systems are drawn from earlier times, as it was initially practiced by lay people who studied medicine to cure illnesses and protect their own health. This form of healthcare was the only type of care throughout most of history, and its medical knowledge has been passed down over generations. Folk remedies have benefited people's health ever since people started investigating ways to maintain, preserve, and recover health. However, most of the knowledge used in the treatment is not recorded but will be remembered, thus risking that all knowledge may be lost with an individual folk healer.

Therefore, gathering the wisdom of folk healers in the use of medicinal plants in the treatment of diseases should be considered to conserve and document local wisdom so that it will not be lost. This study aims to document ethnomedicinal plants used in traditional treatment in Buriram province. The results of this study will be used to create a database for further exploration of these plants to find new therapeutic substance(s) or to support primary healthcare.

Materials and Methods

This study was carried out using a mixed-method approach, including two parts. Part 1 consisted of ethnomedicinal face-to-face interviews using the qualitative approach; part 2 was "identification and classification of medicinal plants" from the obtained data from the first part, which were reported quantitatively.⁵⁻⁶

Study area

Buriram province is located in the southern zone of the Northeast of Thailand (Figure 1). Its area covers 10,393.945 km², which is 6.11% of the region or 2.01% of the country. Buriram province has three terrains: highland and mountains, a shallow undulating area, and a flat area along the Mun river bank. It has a tropical monsoon climate. Buriram province comprises 23 districts, 188 subdistricts, and 2,546 villages. The total population number is 1,586,028, 99.7% are Buddhists, and most of them are agriculturists.

Participants

Study participants were folk healers who (1) live in Buriram, (2) have an official certificate issued by the Department of Thai Traditional and Alternative Medicine, the Ministry of Public Health, and (3) agreed to be interviewed. A list of twenty folk healers was obtained from the provincial public health office, but two had passed away; thus, the remaining eighteen were invited for the study. Local staff of the Thai Traditional Medicine Department contacted folk healers to take part. For this step, four healers were excluded as they did not use medicinal plants. Finally, fourteen (77.8%) agreed to be interviewed. This study

was approved by the institutional review board of the Provincial Public Health Office, Buriram (reference code: BRO 2018-005), and Mahasarakham University (reference code: 101/2562) prior to data collection.

Part 1: Ethnomedicinal interviews

Face-to-face open-ended interviews using a semistructured questionnaire were conducted during August–October 2018. Interview questions comprised folk healer characteristics (gender, age, education, and job), the origin of their herbal knowledge, details of plant species and herbal remedies used in local therapy (name, scientific name, family, used parts, dosage, and methods for use). Interviews were conducted at the healer's home or other appropriate places. They were performed mainly in Thai Isan dialect or Central Thai (the official language of Thailand); each interview session lasted approximately 1-2 hours with synchronized recording for further content analysis. Other local dialects, such as Khmer or Kuy, were also used by local translators when folk healers needed to explain or refer to specific things. Crude medicinal plants were photographed if available.

Part 2: Plant identification

Medicinal plants and crude drugs the healers used were verified by a medicinal plant expert (Miss Somjai Joeprakon, a Thai traditional practitioner) to confirm correct identification of the plant, generic name, and other information. If the expert could not identify a plant, then a sample was collected and prepared as a herbarium specimen for comparing its appearance and characteristics with the National Forest Herbarium data. The voucher specimen of plants were collected at the Faculty of Pharmacy, Mahasarakham University.

Classification and data analysis, descriptive statistics, and frequency and percentage were used to analyze general characteristics of the medicinal plants used by folk healers, including plant families, plant parts, and mode of medicinal plant preparations, and treated diseases or symptoms. For quantitative analysis, the use value index (UVI) was computed per one medicinal plant. UVI is a quantitative method used to reflect the importance of the plant known locally, calculated by $UVI = \sum UV/n$, where: UV is the use value of a plant; U is the number of citations per plant; n is the number of healers [13]. For example, healer A used plant X in three herbal remedies. Thus, value U for healer A equals 3.

Results and Discussion

Part 1: Ethnomedicinal interviews

Participants' Demographics

All participants were male folk healers over 50 years old, who communicated in four dialects: 7 Thai Isan, 3 Thai Khmer, 2 Thai Korat, and 2 Thai Kuy ethnic groups. Their main occupation is farming. Only two of them worked as full-time folk healers. In Thailand, a folk healer is a person who is knowledgeable and capable of promoting health and relieving illness of people by using traditional wisdom inherited from his/her ancestor or venerable folk teachers. There are three levels of folk healers: licensed healer who completed and passed the national licensing examination; certified healer who is accepted and respected by a community and must be nominated by a community committee and considered and approved by a provincial committee; recognized healer who is a person known by the community and the provincial public health office but not licensed nor certified. Our study focused on the certified group because their knowledge and experience are enormous but still undisclosed.

Knowledge transition

All participants mentioned that they had inherited knowledge about medicinal plants for therapeutic purposes from their ancestors (n = 10) and learned from their folk healer masters (n = 8). Interestingly, four of them learned from both their ancestors and masters, which was consistent with the results of a previous study.⁷ It is considered common that traditional knowledge is a family legacy and maintained by inheritance.

Beliefs about Illness and Treatment

Folk healers believed that nature imbalance causes illness. All healers in this study believed, as in Thai local wisdom, that the human body is made up of four elements (*dhātu si*): earth (*dhātu din*), water (*dhātu nam*), wind (*dhātu lom*), and fire (*dhātu fai*). These elements should be normally balanced. However, if the balance becomes distorted, the body would be weakened and become ill. Body distortion might be due to physical malfunction or environmental change. Some folk healers also believed that illness is sometimes caused by the supernatural, for example, ghosts, spirits, devils, and forest demons. However, the beliefs related to health and sickness might differ in other communities. A connection between body imbalance, divine being, and the supernatural was frequently mentioned for traditional healing in ancient times when disease causes were mysterious. This concept is dominantly found in specific tribes, especially in Asia, Africa, and New Zealand, and might also be associated with religion.⁸ Although Western medical knowledge is strongly trusted, our study found that folk healers are still believed in and respected by the community. In an initiation ritual, traditional oblations (13 out of 14 healers), for example, white flowers, incenses and candles, and *Mantras/Gathas* (12 out of 14 healers), were initially required before the physical illness treatment. Additionally, many Thais believe that *Mantras/Gathas* can expel evil or protect treatment remedies from bad spirits. This process was also important in folk medicine to stabilize the mind and spirit of patients. According to traditional healing philosophy, the treatment of illness is not only associated with solving physical problems but also related to healing the spiritual component.⁸ After the initial process of spiritual therapy, practitioners accommodated their healing practices to the patients, e.g., herbal remedies in various dosage forms or with massage to treat physical illness.

Part 2: Plant identification and classification

Medicinal plants

This study identified 220 medicinal plants from 76 families that folk healers use for therapeutic purposes. The top three families were Fabaceae (n = 33), Euphorbiaceae (n = 14), and Poaceae (n = 10). The frequencies of other families are shown in Figure 2. Lewis et al. indicated that Fabaceae was frequently reported and distributed globally. In Thailand, this plant family is utilized in all regions.⁹ The phytochemical investigations previously found that flavonoids are the main constituents. Fabaceae are known to have various pharmacological effects: oestrogenic, antibacterial, antioxidant, antifungal, and insecticidal activities. Thus, the family has been reported to be beneficial in a wide range of diseases such as polymenorrhea, anemia, ulcers, and menorrhagia (during pregnancy).¹⁰ Euphorbiaceae is a large family of flowering plants, composed of over 300 genera and 8,000 species. Euphorbiaceae contain a variety of phytochemicals such as alkaloids, phenols, flavonoids, saponins, tannins, and essential oils. These plants also exhibit a broad range of pharmacological effects such as antimicrobial, antitumor, antimalarial, antiulcer, anti-inflammatory, and analgesic activities.¹¹ The third most common family is Poaceae. Many types of grasses belong to the Poaceae family, which are used in South African and Pakistani traditional medicines. Grasses were reported to have a vast number of pharmacological effects such as antimicrobial, antioxidant, and anti-inflammatory activities.¹²⁻¹³

Fourteen plant parts were reported to be used in herbal remedies by folk healers. The top three parts include root (26.1%), aerial stem, (23.5%), and tuber/bulb (13.2%). Other used parts are illustrated in Figure 3. For Thai Karen and Lawa, the most commonly used part for medicinal purposes was the root.¹⁴ In traditional Chinese medicines, roots were also dominant parts in the preparation of recipes.¹⁵ However, plant parts used in folk recipes are divergent in East Africa, where leaves were often used.¹⁶

Clearly, the underground parts were favored by our folk healers. Folk medicine principles stated that the underground parts were close to the soil and could absorb nutrients before the other parts, so they accumulated high amounts of active compounds. This assumption was unlikely to be correlated with scientific evidence: the amount of active compounds normally varies between plant parts. For example, Yu et al. found that leaves of *Potentilla fruticosa* in China have the highest antioxidant activity compared with the flowers and stems.¹⁷ Feduraev et al. (2019) reported that the antioxidant activity of sorrel plants in Russia was in descending order as follows: the generative part (flowers, seeds), leaves, root, and stem, respectively.¹⁸ Use value indices of commonly found plant species for therapeutic purposes in Buriram province are shown in Table 1.

The top three most important plants used by folk healers with UVI of 0.64 were *Walsura villosa* Wall. ex Hiern, *Piper nigrum* L., and *Smilax glabra* Roxb. Other important plants included *Cocos nucifera* L. (UVI = 0.57), *Derris scandens* (Roxb.) Benth. (UVI = 0.50), *Allium sativum* L. (UVI = 0.50), and *Smilax corbularia* Kunth. (UVI = 0.50). *Walsura villosa*, or *Khad-lin*, has benefits in a range of common conditions, e.g., gastrointestinal problems, stopping bleeding, and wound healing. It belongs to the mahogany family (Meliaceae), which possesses several pharmacological activities such as antimicrobial treatment of dental and gastrointestinal disorders, malaria fevers, and skin diseases.¹⁹ *Piper nigrum* L. or black pepper contains piperine, which has extensive biological effects such as antiproliferative, antidiabetic, cardioprotective, antimicrobial, and immunomodulatory effects.²⁰ *Smilax glabra* Roxb or *Kow-yen-tai* has long been used in Chinese and Thai traditional medicine. This plant was proved to have a high antiallergic effect²¹ and was used to treat syphilitic poisoned sores, limb hypertonicity, morbid leucorrhea, and other conditions.²² As seen from the literature, the plants used in folk medicines have various effects; therefore, they can assist folk healers in dealing with common ailments.

Folk Medicine Therapy

Preparation methods for herbal remedies were simple for household use, such as decoction, grinding with sandstone, or maceration with rice whisky. Folk healers believed that decoction was the best method to extract active compounds. Dosage and duration of use depended on disease and severity, ranging from a week up to months. Most herbal remedies were administered orally (84.62%). Skin application (8.88%) and poultices (3.55%) were also mentioned in particular diseases. In oral administration, decoction was the most frequently used method (81.12% or n = 116). Other administration modes are shown in Figure 4. The remedy might be composed of single or mixed plant components.

Fifteen symptoms were found to be treated in folk healer practice. The details of each symptom and disease were categorized in Table 2. The top three symptoms were: gastrointestinal disorders (16.07%), cancer (10.71%), and respiratory conditions (9.82%). Other symptoms are shown in Figure 5, most of which are common ailments. Gastrointestinal disorders were also reported as the most frequent conditions that the healers deal with in daily practice. Using folk medicines to treat cancer sounds beyond scientific belief. However, some plants, e.g., black pepper, have been proved to exhibit antiproliferative effects. Thus, they have a potential impact on cancer. Nonetheless, it is worth noting that the term "cancer" in Thai traditional medicine is defined broadly. Lumlerdkij et al.²³ gathered information regarding cancer-meaning in Thai traditional medicines from thirty-three informants. The authors summarized that cancer is related to five components: body waste accumulation; chronic illnesses; inflammation; bad blood and lymph, and the imbalance of four basic elements (*dhātu si*). Therefore, cancer mentioned by folk healers could mean any of these, which is different from modern medicine.²³

Table 1: List of plants used for therapeutic purposes

UVI	Scientific name (family)	Part used	Symptoms or diseases		
0.64	<i>Walsura villosa</i> Wall. ex Hiern. (Meliaceae)	Bark	Cancer Gastrointestinal disease		
		Root	Cancer Gastrointestinal disease		
		All parts	Cancer Endocrine disease		
	<i>Piper nigrum</i> L. (Piperaceae)	Seed		Circulatory system diseases Female reproductive system disease and pregnancy Musculoskeletal system disease Respiratory tract diseases	
			<i>Smilax glabra</i> Roxb. (Smilacaceae)	Rhizome	Cancer Female reproductive system disease and pregnancy Male reproductive system diseases Emerging infectious diseases
					Cancer Endocrine disease Brain and nervous System disorders
					Brain and nervous system disorders Gastrointestinal disease Circulatory system diseases
	0.57	<i>Cocos nucifera</i> L. (Arecaceae)	Root	Cancer	
			Coconut water (liquid endosperm)	Cancer	
			Coconut meat (solid endosperm)	Skin Disease Musculoskeletal system disease Brain and nervous system disorders	
0.5	<i>Derris scandens</i> (Roxb.) Benth. (Fabaceae)	Stem	Gastrointestinal disease Musculoskeletal system disease		
			<i>Allium sativum</i> L. (Amaryllidaceae)	Bulb	Circulatory system diseases Musculoskeletal system disease Cancer
	<i>Smilax corbularia</i> Kunth. (Smilacaceae)	Rhizome			Female reproductive system disease and pregnancy Male reproductive system diseases Emerging infectious diseases Cancer
			Endocrine disease		
0.43			<i>Caesalpinia sappan</i> L. (Fabaceae)	Wood	Circulatory system diseases Musculoskeletal system disease Cancer
					<i>Borassus flabellifer</i> L. (Arecaceae)
		Root	Circulatory system diseases		
<i>Curcuma zedoaria</i> (Christm.) Roscoe. (Zingiberaceae)	Rhizome		Circulatory system diseases Urinary system disease Respiratory tract diseases		

0.35	<i>Salacia chinensis</i> L. (Celastraceae)	Stem	Cancer Gastrointestinal disease Musculoskeletal system disease
	<i>Ficus foveolata</i> Wall. (Moraceae)	Stem	Brain and nervous system disorders Musculoskeletal system disease
	<i>Clausena guillauminii</i> (Rutaceae)	Root Leaf	Other accidents, toxins, and venomous animals causing diseases
	<i>Cyperus rotundus</i> L. (Cyperaceae)	Rhizome	Skin disease Endocrine disease Gastrointestinal disease Urinary system disease

Table 2: List of symptoms and diseases treated by folk healers

No.	Symptom or disease	Details
1	Gastrointestinal disease	Liver disease, jaundice, hemorrhoid, mouth ulcers, gastritis, gastroesophageal reflux disease, ulcerative colitis, toothache, swollen gums, chronic constipation, hernia, laxative drug, acute abdominal pain, food poisoning, gall stone
2	Cancer	Uterine cancer, breast cancer, neck cancer, lung cancer, cancer, liver cancer, thyroid cancer, prostate cancer, colorectal cancer, oral cancer, skin cancer, small intestine cancer
3	Respiratory tract diseases	Lung Cancer, Allergy, Tuberculosis, Asthma, Bronchitis, Fever During Menstruation, Nasal Polyps, Cough, Sore Throat, Sinuses, Allergic Rhinitis
4	Skin diseases	Ulcer, snake bites, psoriasis, herpes zoster, abscess and pus, bullous impetigo, diabetic ulcer, dermatophytosis
5	Circulatory system diseases	Anemia, hypertension, congenital heart disease, pericardial heart disease, cardiac arrhythmia
6	Musculoskeletal system disease	Rheumatoid arthritis, Pott's disease, herniated disc pulposus, myalgia, low back pain, joint pain
7	Female reproductive system disease and Pregnancy	Prolapsed uterus/ pelvic organ prolapse, pathological leukorrhea, promoting the menstruation, postpartum hemorrhage, placenta abnormalities, promoting lactation
8	Brain and nervous system disorders	Cerebrovascular accident, migraine, epilepsy, headache
9	Accidents, toxins, and venomous animals cause disease	Bone fracture, detoxication, antivenom, insect bites, burns, scalds
10	Endocrine disease	Hyperthyroidism, gout, body fat loss, hyperlipidemia, diabetes mellitus
11	Urinary system disease	Kidney failure, glomerulonephritis kidney stone, kidney disease
12	Male reproductive system diseases	Gonorrhea, balanitis, prostatitis
13	Emerging infectious diseases	Acquired immunodeficiency syndrome
14	Eye diseases	Amblyopia
15	Other	Food allergy, systemic lupus erythematosus, alcohol-dependent treatment, tonic

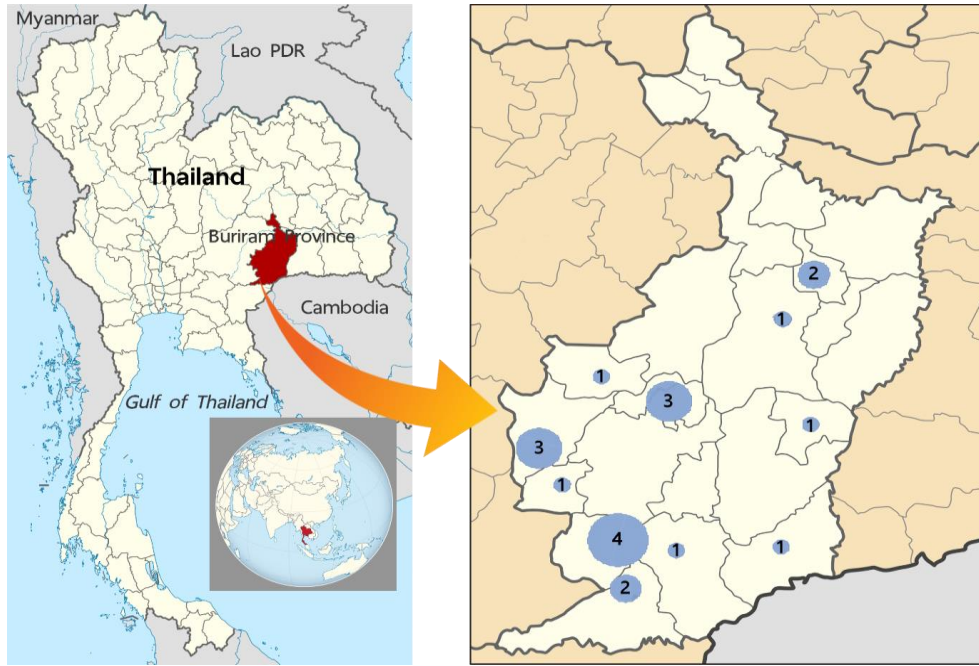


Figure 1: Map of Buriram showing distribution of folk healers interviewed. Circle size and number indicate the number of healers participated in each district

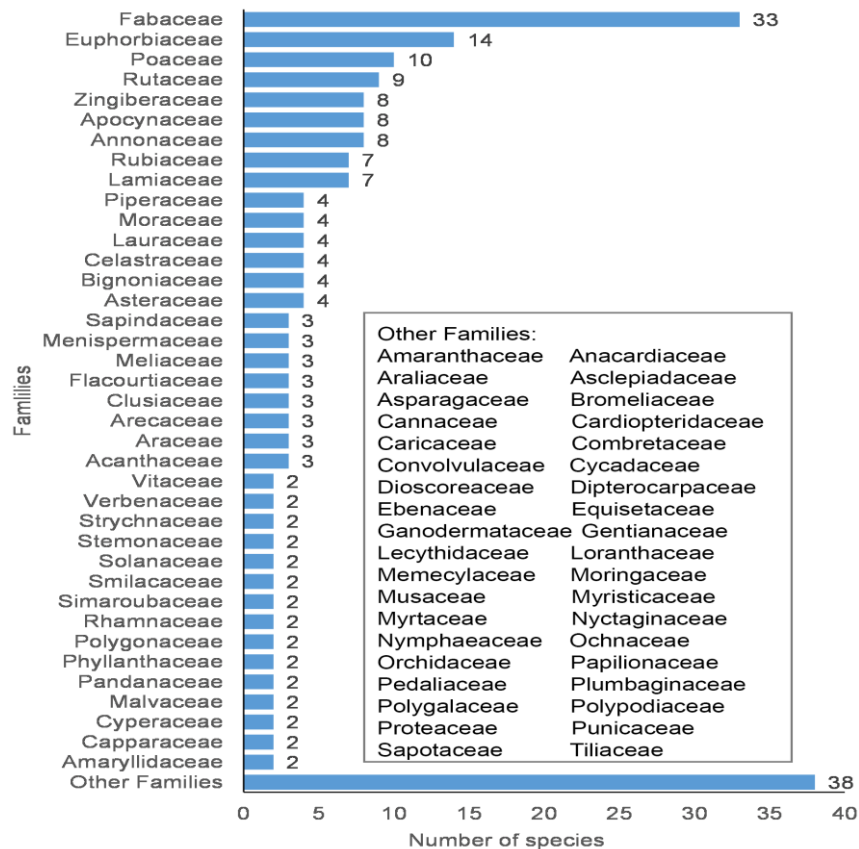


Figure 2: A number of species in each plant family that folk healers used

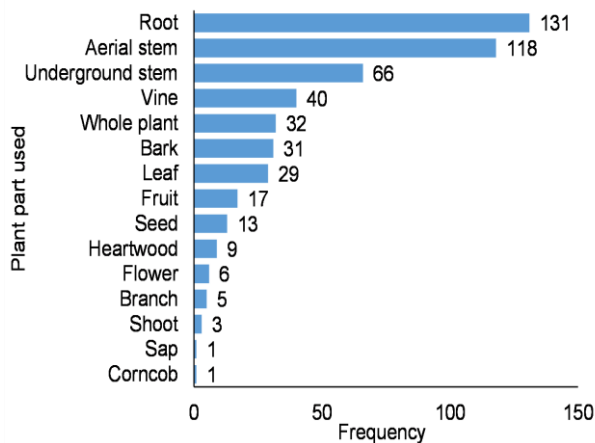


Figure 3: Plant parts used in herbal remedies

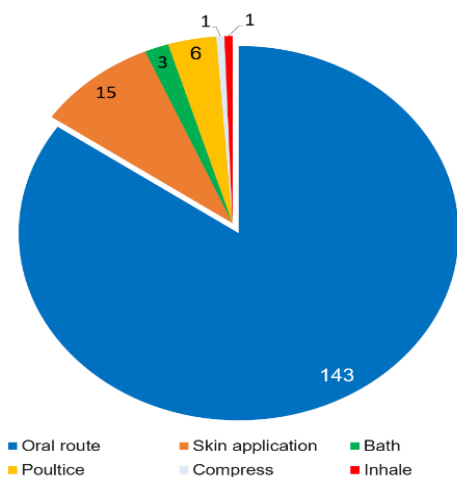


Figure 4: Modes of herbal remedy use

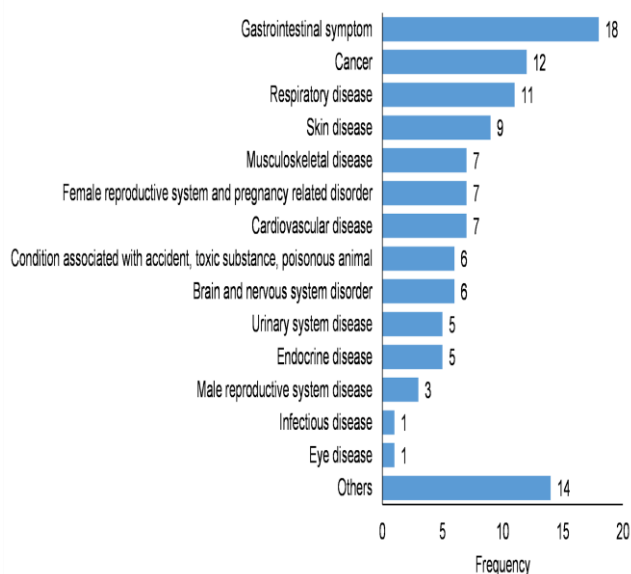


Figure 5: Symptoms and diseases treated by folk healers

Conclusion

In the rural parts of Thailand, medicinal plants are used by folk healers to treat health issues, which could be a potential alternative to modern medicine. These plants are diverse but can be prepared using simple techniques for household use. A range of symptoms can be relieved by herbal remedies. These findings should be recorded as basic knowledge of local wisdom waiting for further scientific research to prove its efficacy.

Conflict of interest

The authors declare no conflict of interest.

Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

Acknowledgements

The authors would like to thank all experts who helped to validate the study instrument and identify plants. They would also like to thank all folk healers and local staff for their great cooperation in the interviews. This study received financial support from the Faculty of Pharmacy, Mahasarakham University.

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