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A survey of herbal weeds that are used to treat gastrointestinal disorders from southern Thailand: Krabi and Songkhla provinces

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ABSTRACT

Ethnopharmacological relevance: Weeds are plants grow naturally and are commonly seen. They are mostly used for feedstuff. However, their use as herbs for treating diseases, including gastrointestinal disorders, is rare. Therefore, the present study aimed to: (1) quantify the number of herbal weeds used for treating gastrointestinal disorders; (2) study local knowledge of weed utilization for treating gastrointestinal disorders in Songkhla and Krabi provinces; and (3) analyse quantitative data with the Informant Consensus Factor (ICF), Use Value (UV) and Fidelity Level (FL).

Materials and methods: The study was conducted from November 2014 to January 2016 through semi-structured interviews with 35 folk healers. The main questions were designed to obtain plant information, including the local name, method of use, preparation method and medicinal properties. The data were analysed by descriptive statistics, quantitative indexes (UV, ICF as well as FL) and interpretation.

Results: A total of 49 species in 46 genera and 28 families were found. The most common use of weeds was as herbs (80%). The preferred part used was the whole plant (76.27%). The preferred methods of drug preparation and use were decoction and drink, respectively. The highest UV was found for *Acmella oleracea* (0.83). The highest FLs (100%) were found for 12 species, including *Amaranthus spinosus*, *Amaranthus viridis*, *Alternanthera sessilis*, *Sauropus androgynus*, *Plantago major,* and others. The highest ICFs (1.00) were found for treating toothache, dysentery, haemorrhoids, intestinal pain and abdominal pain.

Conclusion: Overall, there are reports on the pharmacological activity of 31 species of weeds and reports on toxicity for 20 species of weeds. Therefore, awareness of the use of herbs is necessary to ensure that they are used safely and that benefits arise from the therapy. This study showed that medicinal weeds are still popularly used by folk healers. The pharmacological properties were consistent with the local uses, which supported a preliminary indication that the weed plants were effective for treating gastrointestinal diseases.

1. Introduction

Weeds are plants that grow naturally in the paddy fields, gardens and fallow. These plants are generally used for agriculture, fodder, and other purposes. However, other benefits as well as their use methods are a part of folk knowledge. Their uses as herbal medicines have also been passed down by folk healers in remote areas. Because weeds are plants that grow easily, they can be found easily under many circumstances. Therefore, weeds are a convenient resource to implement in primary health care for treating mild symptoms, such as toothache, abdominal pain, flatulence or other gastrointestinal system disorders.

Gastrointestinal (GI) diseases are found across a range of ages from new-borns to elderly individuals. Both women and men suffer equally from these diseases. A common disease is irritable bowel syndrome (IBS), which includes various symptoms, including abdominal pain, bloating, gas, diarrhea and constipation. It has been estimated that 36% of patients registered in gastroenterology clinics suffer from IBS (Norton, 2015). The treatments include drugs and behavioural changes that are designed to resolve the syndrome based on its predominant symptom. For drug therapy, modern medications and herbal remedies can be used. For instance, natural laxatives from senna, cascara, frangula, and aloe as well as rhubarb are commonly used for treating constipation (Cirillo and Capasso, 2015), and berberine extract from Chinese goldthread rhizome is extensively used for treating diarrhea in China (Chen et al., 2015).

In Thailand, some diseases associated with the GI system are epidemiological surveillance diseases, and they must be reported every year. These diseases include dysentery, cholera, food poisoning, mushroom poisoning, diarrhea and hepatitis. Although their annual pre-

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valence rates are likely to decrease, the appearance of these diseases is still being reported in rural areas (Bureau of Epidemiology, Thailand, 2014). Due to the poor public health resources in those areas, primary health care with herbal medicines collected from the natural environment is necessary.

Since 2013, the Ministry of Public Health of Thailand (2013) has published herbal medicines in the National List of Essential Medicines, including many recipes for GI treatments. The medicinal plants, namely *Pistacia chinensis, Nigella sativa, Terminalia arjuna* and *Syzygium aromaticum* were included. However, many species are not found commonly throughout Thailand. Some herbs are imported from abroad or other parts of Thailand, and they are sold in herbal drugstores. Therefore, a preliminary study of medicinal plants, especially weeds, in traditional rural medicine would promote sustainable utilization of natural resources for primary health care.

According to literature reviews of medicinal plant surveys in Thailand, no study has focused on examining weed plants used to treat gastrointestinal diseases. Therefore, it would be interesting to systematically study and publish the herbal weeds used for treating gastrointestinal diseases. Consequently, patients would have more choices for selecting plants for therapy.

In the present study, southern Thailand was selected as the study area. The south area of Thailand is divided into 2 parts based on its geography, south west and south east coasts. Both areas have diverse plant species. They are also distinct based on the way of life and culture of inhabitants. As such, this present study aimed to: (1) quantify the herbal weeds used for treating gastrointestinal disorders; (2) study local knowledge of weed utilization for treating gastrointestinal disorders from two provinces, including Songkhla, on the east, and Krabi, on the west; and (3) analyse quantitative data using the Informant Consensus Factor, Use Value and Fidelity Level. The outcomes from this study should provide basic information for further research into traditional medicine and phytopharmacological activity.

2. Materials and methods

2.1. Study area

South Thailand, which is located on the Malay Peninsula, has a total area of 70,715.2 sq. km. The length from north to south is approximately 750 km. It is divided into two parts according to geography, including the south west and south east coasts.

The south west coast borders the Andaman Sea. It includes 6 provinces: Ranong, Phang Nga, Krabi, Phuket, Trang and Satun. The coast is geographically steep with many indents and irregular features. There are many islands. Most people make a living from agriculture, especially on para rubber and oil palm plantations, and tourism services supplement those occupations. The culture is integrated with Thai, Chinese and Muslim individuals living together (Hydro and Agro Informatics Institute, 2013a) (Fig. 1).

The south east coast borders the Gulf of Thailand. It consists of 8 provinces: Chumphon, Surat Thani, Nakhon Si Thammarat, Phatthalung, Songkhla, Pattani, Yala and Narathiwat. The coast is a gently undulating and regular shore. Its appearance is a narrow plateau from Chumphon to Narathiwat. Most rivers in the south east coast are short and flow into the Gulf of Thailand (Hydro and Agro Informatics Institute, 2013b). This area is a source of the agricultural and processing industries for rice, livestock and fisheries. It is the vast base of agriculture in Thailand. The culture in the upper part of the east coast is dominated by Buddhism, and it is Muslim in the lower part (Fig. 1).

As mentioned above, basic information about the west and the east areas of southern Thailand includes many differences in terms of plant diversity and way of life, among other factors. These differences may lead to differences in plant utilization. For example, *Alternanthera sessilis* DC. leaves are pasted on the head for treating influenza by folk healers in Krabi (Chantarapon, 2014), while a decoction of the whole plant is applied by Songkhla's folk healers for treating menstrual disorders (Neamsuvan et al., 2012a).

Since there are no studies of weed plants for treating gastrointestinal diseases from these areas, the Songkhla province, as a representative of south east Thailand, and Krabi province, as a representative of south west Thailand, were selected for this study.

2.2. Methods of study

2.2.1. Informants

The informants were folk healers from the Songkhla and Krabi provinces. Their qualifications included being recognized as herbal experts by officers at the Provincial Public Health Offices, more than 20 years of experience in herb use and providing verbal consent to allow the researchers to interview them. Eventually, 35 healers (33 males, 2 females) were included, and 20 were from Krabi and 15 from Songkhla. Fifteen people (42.9%) were 40–60 years old, and twenty people (57.1%) were older than 60 years. Fifteen people (42.9%) were Muslim, and twenty people (57.1%) were Buddhist.

2.2.2. Field survey

The field survey for collecting plant specimens and folk knowledge of herbal weed utilization was carried out from December 2014 to March 2015. Semi-structured interviews were conducted with traditional healers to elicit information about the local plant name, preparation and use methods as well as the properties of each weed. The weeds were photographed. Plant collection and voucher specimens were prepared following standard methods (Martin, 1995) for referencing and depositing specimens at the herbarium of the Faculty of Traditional Thai Medicine, Prince of Songkla University. Scientific names were identified based on the principle of plant taxonomy using available texts, specifically Flora of Thailand, Flora of China and Flora of Pakistan. The legitimate names were checked against The Plant List (2013).

2.3. Quantitative data analysis (Srithi et al., 2009)

2.3.1. Use value (UV)

UV was used to estimate the maximum utilization of each plant. A UV value near zero showed that its use as medicine was limited. UV was calculated with the following formula:

$$UV=(\sum U)/n$$

$\sum U$ is the number of use reports of a given herbal plant.

n is the number of all informants in the study.

2.3.2. Informant consensus factor (ICF)

ICF measures the consistency of the knowledge of folk healers as well as the knowledge of using plants for treating a particular ailment. An ICF value near 1.00 indicates there was homogeneity in the information provided by the folk healers. The ICF is calculated with the following formula:

$$ICF = (N_{ur} - N_t)/(N_{ur} - 1)$$

N_{ur} is the number of use reports for a particular disease.

N_t is the number of species used to treat that particular disease by folk healers.

2.3.3. Fidelity level (FL)

FL was used to find out the most popular species used for treating a particular disease. The FL was calculated with the following formula:

$$FL(\%) = (N_p/N)*100$$

N_p is the number of use reports of a certain plant for treating a particular disease.