



Traditional medicine use by cancer patients in Thailand



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ABSTRACT

Ethnobotanical relevance: Cancer patients commonly use traditional medicines (TM) and in Thailand these are popular for both self-medication and as prescribed by TM practitioners, and are rarely monitored. A study was conducted at Wat Khampramong, a Thai Buddhist temple herbal medicine hospice, to document some of these practices as well as the hospice regime.

Materials and methods: Cancer patients ($n=286$) were surveyed shortly after admission as to which TMs they had previously taken and perceptions of effects experienced. They were also asked to describe their current symptoms. Treatment at the hospice is built upon an 11-herb anti-cancer formula, yod-ya-mareng, prescribed for all patients, and ideally, its effects would have been evaluated. However other herbal medicines and holistic practices are integral to the regime, so instead we attempted to assess the value of the patients' stay at the hospice by measuring any change in symptom burden, as they perceived it. Surviving patients ($n=270$) were therefore asked to describe their symptoms again just before leaving. **Results:** 42% of patients (120/286; 95% CI 36.4%, 47.8%) had used herbal medicines before their arrival, with 31.7% (38/120; 95% CI 24%, 40.4%) using several at once. Mixed effects were reported for these products. After taking the herbal regime at Khampramong, 77% (208/270 95% CI; 71.7%, 81.7%) reported benefit, and a comparison of the incidence of the most common (pain, dyspepsia, abdominal or visceral pain, insomnia, fatigue) showed statistical significance (χ^2 57.1, df 7, $p < 0.001$).

Conclusions: A wide range of TMs is taken by cancer patients in Thailand and considered to provide more benefit than harm, and this perception extends to the temple regime. Patients reported a significant reduction in symptoms after staying at Khampramong, indicating an improvement in quality of life, the aim of hospices everywhere. Based on this evidence, it is not possible to justify the use of TM for cancer in general, but this study suggests that further research is warranted. The uncontrolled use of TMs, many of which are uncharacterised, raises concerns, and this work also highlights the fact that validated, robust methods of assessing holistic medical regimes are urgently needed.

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1. Introduction

Cancer patients in all parts of the world are known to take herbal and nutritional medicines and may be at risk of drug interactions (Alsanad et al., 2014). In Thailand, as in most parts of Asia, the use of natural medicines is part of the national culture and research in cancer therapy is tending toward a holistic approach (Itharat and Ooraiikul, 2007). Traditional medicines (TMs; which include herbal and nutritional supplements and some animal and mineral products) are mainly used as a form of self-medication or prescribed by complementary and alternative medicine (CAM) practitioners and their use is not reported to official organisations. Adverse effects to TMs are not usually recorded by drug monitoring

agencies (Shaw et al., 2012) and patients' opinions on their perceived benefits and adverse effects have rarely been sought, so there exists a large population of patients taking an array of unknown TMs for a wide range of disorders with little or no observation or evaluation of their worth or otherwise. Meanwhile, patients continue to take supplements to try to cure, halt or delay the progression of their disease and to manage the symptoms of conventional treatment such as chemotherapy and radiotherapy.

The Arokhayasala Foundation at Wat (=temple) Khampramong in north-eastern Thailand is a traditional medicine hospice (henceforth referred to as Khampramong) which has offered palliative care, free of charge, to cancer patients since 2005. Herbal medicines (HM) and dietary therapies are normally used as the sole treatment, especially when conventional treatment has no more to offer, but also in conjunction with conventional medicine when required. Khampramong also provides a holistic combination of other therapies which include meditation, prayer, dancing, and laughter and

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music therapy (Khampramong, 2014). Part of the ethos of the Arokhayasala Foundation is to carry out research in order to benefit future patients, but as a Buddhist organisation dedicated to helping all patients, clinical interventions such as placebo-controlled studies are not possible. The hospice regime is built upon an 11-herb anti-cancer formula (yod-ya-mareng) which is prescribed for all patients and ideally, the effects of this formula should be evaluated, but as the regime is entirely holistic, we attempted instead to assess its overall value by measuring changes in occurrence of the most common symptoms over the course of the patients' admission, according to their own views. The WHO-UMC (World Health Organisation-Uppsala Monitoring Centre) criteria are applicable for evaluating the causality of adverse events for herbal medicines (WHO, 2011) but all the patients had been prescribed at least 9 types of herbal regimes each day in addition to other therapies so it was not possible to identify the causes of specific events. In the absence of any available validated methodology to evaluate complex situations over which no control can be exerted, an observational study was conducted to explore 1) the herbal medicines that cancer patients take in Thailand generally, and perceptions of the effects of each, and 2) the value of the mainly herbal but holistic treatment regime at Khampramong, as experienced by patients. It must be emphasised that these are subjective reports, and not supported by clinical or laboratory evidence, except in the case of the original cancer diagnosis.

2. Materials and methods

2.1. Approvals

Organisational approval to collect data from patients at Khampramong concerning their medical history, their previous experiences of using herbal medicines, the traditional medicines they had taken, and their experiences of the regime at Arokhayasala was granted by the Abbot (author PP, July 8th 2012). Ethical approval for the study was obtained from the University of Reading Research Ethics Committee, UK (Project 12/34), the Thai Traditional Medicine Committee and Sirindhorn College of Public Health, Yala, Thailand (Project no 094/2555).

2.2. Participants

Patients who were resident at Khampramong during data collection periods, and who met the inclusion criteria, were invited to participate in the study. A trained researcher (author BP, a pharmacist registered in Thailand) approached patients and gained their informed consent.

2.2.1. Inclusion criteria

Patients resident at Khampramong who were 20 years or older, had a cancer or cancer-related diagnosis (e.g. adverse effects associated

with treatment for their cancer) from their hospital doctor, spoke Thai or English, and gave their informed consent to participate in the study.

2.2.2. Exclusion criteria

Patients not resident at Khampramong, did not have a cancer or cancer-related diagnosis, were < 20 years old, unable to speak Thai or English, or did not give informed consent.

2.3. Study design

The study consisted of 1) a survey of the past use of traditional medicines taken for cancer before patients came to Khampramong and their perceived benefits and harms, and 2) an investigation of the perceived effects of the Khampramong regime. Data were collected using a researcher-administered questionnaire (Fig. 1), initially within 4 days of arrival at the temple, and again just before departure, to investigate any change in symptom burden.

2.4. Questionnaire development

The questions were developed by authors BP and RH in consultation with the Abbot of Khampramong (author PP) and focused on the type of traditional medicines patients had taken after being diagnosed with cancer but before coming to Khampramong, and their perceived benefits and harms (questions 1–4). Patients were also asked to describe the effects of the Khampramong regime, which is based on an anticancer formula containing 11-herbs called yod-ya-mareng (questions 3 and 4). The questionnaire was developed in English and translated into Thai by a qualified translator from the Thai Embassy in London. The Thai language version was then back-translated to English by BP to ensure the meaning of the questions had not changed. The questionnaire was validated in a pilot study of 86 patients at Khampramong prior to the main study. No changes were necessary and the results from the pilot study were subsequently combined with the main study results (200 patients).

2.5. Data collection

Data collection was carried out by at Khampramong. Interviews were conducted in Thai and answers were recorded onto paper copies of questionnaires in Thai. Participants were assigned a sequential numeric code and could not be identified from their responses. Patients were interviewed within four days of their admission to Khampramong (or the start of the study) (questions 1–4) and just before leaving Khampramong (questions 3 and 4), but data is incomplete for 16 patients who died during the course of the study. The time interval between interviews was highly variable and depended on the time that the study started and/or the duration of their stay (mean 30 days; SD \pm 32, minimum 3, maximum 148 days). Only three patients stayed for less than one

Questions asked about pastexperience of taking traditional medicines

- 1) Have you used any traditional or herbal medicine for your cancer or related symptoms before coming to Khampramong?
 a) Yes b) No
 If No, go straight to question 3.
- 2) What kind of traditional medicines did you use before? Why did you use them?
- 3) Did you feel that the herbal medicines you have taken (including at Khampramong) helped?
 a) Yes b) No If yes, please give more detail
- 4) Did you feel any unpleasant effects from the herbal medicine (including at Khampramong)?
 a) Yes b) No If yes, please give more detail

Fig. 1. The guided questions asked of patients about their use of traditional medicine.

week, mainly to be prescribed herbal medicines to collect and use at home.

2.6. Data analysis

2.6.1. Herbal products taken before admission to Khampramong

Quantitative data collected from the questionnaires were translated into English by BP and entered into Microsoft Excel. Data entry was double checked for accuracy and analysed using descriptive statistics. The percentage (95% confidence interval) of patients taking individual herbs, natural products or formulae for indications related to their cancer diagnosis before admission was recorded to identify the most important herbs or formulae and their perceived effects. Common Thai names of remedies and local names of herbs cited by the patient were checked by author PP and their botanical sources checked by author EW. Products and formulae are documented by the name given by the patient.

2.6.2. Evaluation of the treatment regime at Khampramong

As the regime uses other herbal medicines as well as yod-ya-mareng, it was not possible to ascribe any effects to a single therapy. In a preliminary attempt to evaluate a complex situation, in the absence of suitable validated methods and without being able to conduct an intervention, we used changes in symptom burden, calculated from signal generation as used in pharmacoepidemiology, as a measure of effect of the regime as a whole. Each symptom reported by each patient was recorded as one signal, entered into an MS Excel spread sheet and the totals summarised in the form of a bar chart. The difference in signal strength for each symptom between the two time points was used to indicate changes in the symptom burden and was subjected to simple statistical analysis using chi-square tests (SPSS 21).

2.7. Details of the most important herbal formulae

The composition of the Singburi remedy is shown in Table 1 but could not be ascertained for other formulae because patients could not remember or had not been told. During their stay at Khampramong, all 286 patients were prescribed the 11-herb formula yod-ya-mareng, the ingredients of which are shown in Table 2. It is made as a decoction initially and usually given in liquid form, but a freeze-dried extract capsule formulation of the decoction (made by the Thai Institute for Traditional Medicine) is available for patients who have restrictions on the amount of liquid they can tolerate, for example those with liver cancer.

3. Results

3.1. Traditional medicines taken before arrival at Khampramong and their perceived effects

120 of the 286 patients (42.0%; 95% CI 36.4%, 47.8%) surveyed reported having taken TMs after their cancer diagnosis but before their visit to Khampramong. Those who had taken TMs previously were asked if they had experienced beneficial or harmful effects from taking them and the results are shown in Table 3 (individual herbs or other natural products) and Table 4 (formulae). All the herbs cited were used to treat cancer either directly or indirectly; herbs taken for unrelated reasons (e.g. haemorrhoids) accounted for only 4 reports and were excluded from the results. Symptoms such as aphthous ulcers and fever were considered by patients to be related to either their illness or from chemotherapy ('chemo') and are included in the results. Reasons such as 'detoxification' ('detox'), and 'boosting the immune system' were also reported by patients as relevant to treating cancer.

Table 1

Herbal constituents of Ya-tan-mareng (anti-cancer remedy from province of) Singburi (Singburi remedy).

Plant species (scientific name and family)	Common names Thai, English
<i>Acanthus ebracteatus</i> Vahl (Acanthaceae)	Ngueak Plamo; Holly mangrove, sea holly
<i>Asclepias curassavica</i> L. (Apocynaceae)	Phi-daun-ha; tropical milkweed
<i>Canna indica</i> L. (Cannaceae)	Pang-puay; Indian shot; canna lily
<i>Catharanthus roseus</i> (L.) G. Don (Apocynaceae)	Put-tha-ruk-sa; Madagascar/rosy periwinkle
<i>Clinacanthus nutans</i> (Burm.f.) Lindau. (Acanthaceae)	Pha-ya-yor; Sabah snake grass
<i>Dioscorea membranacea</i> Pierre ex Prain & Burkill (Dioscoriaceae)	Khao Yen Thai; Malacca yam
<i>Polygala chinensis</i> L. (Polygalaceae)	Peak-khai-dum; Indian milkwort
<i>Smilax corbularia</i> Kunth (Smilacaceae)	Khao Yen Nuea

Herbs which are components of both formulae are shaded for comparison but no inference of efficacy can be drawn from this.

Table 2

Herbal constituents of yod-ya-mareng.

Plant species (scientific name and family)	Common names Thai; English
<i>Acanthus ebracteatus</i> Vahl (Acanthaceae)	Ngueak Plamo; Holly mangrove, sea holly
<i>Cordia globifera</i> W.W. Sm. (Boraginaceae)	Mai Sakhin
<i>Dioscorea membranacea</i> Pierre ex Prain & Burkill (Dioscoriaceae)	Khao Yen Thai; Malacca yam
<i>Eupatorium capillifolium</i> (Lam.) Small ex Porter & Britton (Compositae)	Goat Ju La; Dog fennel
<i>Hydnophytum formicarum</i> Jack (Rubiaceae)	Hua Roi Ru; Ant plant
<i>Levisticum officinale</i> W.D.J. Koch (Apiaceae)	Goat Chiang; Lovage
<i>Orthosiphon aristatus</i> (Blume) Mig. (Lamiaceae)	Ya Nuat Maeo; Cat's whiskers; Java tea
<i>Polyalthia cerasoides</i> (Roxb.) (Annonaceae)	Ka Chian
<i>Rhinacanthus nasutus</i> (L.) Kurz (Acanthaceae)	Thong Phan Chang; Snake jasmine
<i>Salacia chinensis</i> L. (Celastraceae)	Kam Phaeng Chet Chan; Lolly vine
<i>Smilax corbularia</i> Kunth (Smilacaceae)	Khao Yen Nuea

Herbs which are components of both formulae are shaded for comparison but no inference of efficacy can be drawn from this.

Table 3

Use of individual herbs and other natural materials by cancer patients before arrival at Khampramong.

Herb (species and family)	Common name(s) Thai, English, other if appropriate	No. (%; CI) of patients (n=120) reporting	Indication (as related to cancer, stated by patient)	Main benefits attributed (no. of patients reporting)	Adverse events attributed (no. of patients)
Powdered herbs and whole extracts					
<i>Ganoderma lucidum</i> (Fr.) Karst. (Ganodermataceae)	Hed-lin-jur; Glossy ganoderma; Linzhi/reishi mushroom	18 (15.0%; 95% CI 9.7%, 22.5%)	Cancer	Improved appetite (6), better sleep (2), reduced tumour mass (2), more energy (1)	Headache (1), pain (1), insomnia (1), constipation (1), vomiting (1)
<i>Andrographis paniculata</i> (Burm.f) Nees (Acanthaceae)	Fa-tha-lai-chon; king of bitters	6(5.0%; 95% CI 2.3%, 10.5%)	Colds, flu and fever (5), diarrhoea (1)	Relief of fever (2), improved appetite (1)	–
<i>Curcuma longa</i> L. (Zingiberaceae)	Kha-min-chan; Turmeric	6(5.0%; 95% CI 2.3%, 10.5%)	Digestive and liver problems	Relief of dyspepsia (3)	–
<i>Moringa oleifera</i> Lam. (Moringaceae)	Ma-rum; Drumstick/Horseradish tree	5 (4.2%; 95% CI 1.8%, 9.4%)	Cancer	–	–
<i>Murdannia loriformis</i> (Hassk.) R. R. Kamm. (Commelinaceae)	Ya pak-king; Beijing/ Angel grass	5 (4.2%; 95% CI 1.8%, 9.4%)	Cancer	Cooling effect (1), laxative (1)	–
<i>Tiliacora triandra</i> Diels (Menispermaceae)	Ya-nang; Bamboo grass	5 (4.2%; 95% CI 1.8%, 9.4%)	Cancer (1), detox (2), aphthous ulcers (2)	Laxative (1), ulcers cured (1), swelling reduced (1)	–
<i>Houttuynia cordata</i> Thunb. (Saururaceae)	Phlu-khao; Heart-leaved houttuynia	4 (3.3%; 95% CI 1.3%, 8.3%)	Cancer (3), nourishment (1)	–	Swollen abdomen (1)
<i>Thunbergia laurifolia</i> Lindl. (Acanthaceae)	Rang-jurd; Laurel clock vine	4 (3.3%; 95% CI 1.3%, 8.3%)	Recurrent aphthous ulcers	Pain relief (1), cooling effect (1), ulcers cured (1)	–
<i>Tinospora crispa</i> (L.) Hook. f. & Thomson (Menispermaceae)	Bora-phet; Heart-leaved moonseed	4 (3.3%; 95% CI 1.3%, 8.3%)	Recurrent aphthous ulcers	Improved sleep (1)	Diuretic effect (1)
<i>Panax ginseng</i> CA Meyer (Araliaceae)	Soam; Ginseng	3 (2.5%; 95% CI 0.9%, 7.1%)	Nourishment	Felt stronger (1), improved appetite (1)	–
<i>Phyllanthus amarus</i> Schum. et Thonn. (Phyllanthaceae)	Look-tai-bai; Hurricane weed	3 (2.5%; 95% CI 0.9%, 7.1%)	Breast cancer (1), dyspepsia (1), fever (1)	Relief of fever (1)	–
<i>Camellia sinensis</i> L. (Theaceae)	Cha-kheaw; Green tea	2 (1.7%; 95% CI 0.5%, 5.9%)	Antioxidant for general health	–	–
<i>Pseuderanthemum latifolium</i> B. Hansen (Acanthaceae)	Hoan-ngoc; Xuân hoa	2 (1.7%; 95% CI 0.5%, 5.9%)	Breast cancer	Fever relief (1)	–
<i>Anacardium occidentale</i> L. (Anacardaceae)	Ma-muang-him-ma-pan; Cashew	1 (0.8%; 95% CI 0.2%, 4.6%)	Nourishment	–	–
<i>Asystasia gangetica</i> (L.) T. Anderson (Acanthaceae)	Ben-ja-rong; Ganges primrose	1 (0.8%; 95% CI 0.2%, 4.6%)	Recurrent aphthous ulcers	Laxative effect	–
<i>Bauhinia sirindhorniae</i> K. Larsen & Larsen (Leguminosae)	Pra-dong; Bauhinia vine	1 (0.8%; 95% CI 0.2%, 4.6%)	Remove lymphatic waste	Felt stronger, more energy	–
<i>Centella asiatica</i> (L.) Urban. (Apiaceae)	Bua-bokGo, tu kola; Asiatic pennywort	1 (0.8%; 95% CI 0.2%, 4.6%)	Anti-inflammatory	Reduced swelling	–
<i>Coffea arabica</i> L. (Rubiaceae)	Coffee	1 (0.8%; 95% CI 0.2%, 4.6%)	Detoxification	Laxative effect	–
<i>Ficus carica</i> L. (Moraceae)	Ma-dur; Fig	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
<i>Garcinia mangostana</i> L. (Clusiaceae)	Mang-kud; Mangosteen	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
<i>Gynura divaricata</i> (L.) DC. (Compositae)	Pae-tum-pueng; Bai Bei San Qi (TCM)	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
<i>Levisticum officinale</i> W.D. J. Koch. (Apiaceae)	Khod-chiang; Lovage	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
<i>Nigella sativa</i> L. (Ranunculaceae)	Tian-dum; Black seed; Black cumin	1 (0.8%; 95% CI 0.2%, 4.6%)	Nasopharyngeal bleeding	Bleeding stopped	–
<i>Pandanus amaryllifolius</i> Roxb. (Pandanaeae)	Bai-toei; Pandan	1 (0.8%; 95% CI 0.2%, 4.6%)	Detoxification	Laxative	–
<i>Phyllanthus emblica</i> L. (Phyllanthaceae)	Ma-kham-pom; Emblic myrobalan	1 (0.8%; 95% CI 0.2%, 4.6%)	Cough	Cough relieved	–
<i>Psidium guajava</i> L. (Myrtaceae)	Pha-rung; Guava	1 (0.8%; 95% CI 0.2%, 4.6%)	Diarrhoea	–	–
<i>Salacia chinensis</i> L. (Celastraceae)	Kham-pang-jet-chan; River spiderwort	1 (0.8%; 95% CI 0.2%, 4.6%)	To nourish the liver	–	–
<i>Saussurea involucrata</i> Matsum. & Koidz. (Compositae)	Bao-hi-mha; Snow lotus	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	Diarrhoea Fever
<i>Stemona collinsiae</i> Craib. (Stemonaceae)	Nhon-tai-yak	1 (0.8%; 95% CI 0.2%, 4.6%)	Remove lymphatic waste	–	–
<i>Tamarindus indica</i> L. (Leguminosae)	Ma-kham; Tamarind	1 (0.8%; 95% CI 0.2%, 4.6%)	Detoxification	'Good' blood test result	–
<i>Terminalia catappa</i> L. (Combretaceae)	Hu-kwang; Bengal almond	1 (0.8%; 95% CI 0.2%, 4.6%)	Nourishment	Felt stronger, more energy	–
				Improved appetite	–

Table 3 (continued)

Herb (species and family)	Common name(s) Thai, English, other if appropriate	No. (%; CI) of patients (n=120) reporting	Indication (as related to cancer, stated by patient)	Main benefits attributed (no. of patients reporting)	Adverse events attributed (no. of patients)
<i>Vigna mungo</i> (L.) Hepper (Leguminosae)	Thaw-dum; Black gram; Urad dal	1 (0.8%; 95% CI 0.2%, 4.6%)	To boost immune system		
Refined extracts from herbs and foods					
Rice bran oil: from <i>Oryza sativa</i> L. (Poaceae)	Num-mun-rum-khao	6 (5.0%; 95% CI 2.3%, 10.5%)	Nourishment	Improved appetite (2), improved sleep (1)	–
Beta glucans: from spp. of <i>Aureobasidium</i> . (Dothioaceae)	Yeast-dum	3 (2.5%; 95% CI 0.9%, 7.1%)	Cancer		–
Aloe vera gel: from <i>Aloe</i> species (Xanthorrhoeaceae)	Wan-hang-cha-ra-khe	1 (0.8%; 95% CI 0.2%, 4.6%)	Anti-inflammatory	Reduced swelling	–
Chlorophyll	'Chlorophyll drink'	1 (0.8%; 95% CI 0.2%, 4.6%)	–	–	–
Sesame oil: from <i>Sesamum indicum</i> L. (Pedaliaceae)	Num-mun-nga	1 (0.8%; 95% CI 0.2%, 4.6%)	Detoxification	Easier breathing	–
Vitamin C	Vitamin C; ascorbic acid	1 (0.8%; 95% CI 0.2%, 4.6%)	–	–	–
Non-plant products (of animal or human origin)					
Human urine (fresh, patient's own, first of day, mid-flow)	Num-pat-sa-wa; patient's own urine	2 (1.7%; 95% CI 0.5%, 5.9%)	'To boost the immune system'	–	–
<i>Stolephorus dubiosus</i> Wongrata (Engaulidae)	Sai-ton; Thai anchovy	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
<i>Crocodylus</i> species* (Crocodylidae)	Leud-chaw-ra-khe; Crocodile blood	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	Wound felt to be 'burning'

NB: Herbs are listed in alphabetical order within their ranking of popularity. Many patients (38/120 patients; 31.7%; 95% CI 24%, 40.4%) reported taking more than one remedy, and each herb (or formula) taken by one patient is listed as 1 report in order to produce an estimate of the most frequently used herbs and the reasons for taking them. Number of patients reporting a particular event given in parentheses (unless only one patient taking the remedy).

* Species not known, but likely to be the Siamese crocodile, *Crocodylus siamensis* which is extensively farmed in Thailand (although almost extinct in the wild), or the saltwater crocodile, *C. palustris*, which is found widely in SE Asia.

Of the single herbs taken, by far the most popular was linzhi mushroom, *Ganoderma lucidum* which was taken to treat cancer by 18/120 patients (15%; 95% CI 9.7%, 22.5%) prior to visiting Khampramong. Benefits reported included improved appetite (6/120; 5%; 95% CI 2.3%, 10.5%), improved sleep (2/120; 1.7%; 95% CI 0.5%, 5.9%), reduced tumour mass and more energy (1 report each; 0.8%; 95% CI 0.2%, 4.6%); however, headache, insomnia, constipation and vomiting were also reported (1 of each symptom for linzhi; 0.8%; 95% CI 0.2%, 4.6%). *Andrographis paniculata* and turmeric, *Curcuma longa*, were each taken by 6/120 patients (6 patients; 5%; 95% CI 2.3%, 10.5%) for purposes other than treating cancer, and *Moringa oleifera* and *Murdannia loriformis* by 5/120 patients each (4.2%; 95% CI [1.8%, 9.4%]), for treating cancer. Various positive effects, but no adverse effects, were reported for any of these (see Table 3). The remedies described here provide only a snap-shot of TM use in a specific patient population, and do not constitute evidence of efficacy or otherwise.

Traditional formulae were also popular, and the most commonly used was the Singburi remedy (for composition, see Table 1) which was taken by 16/120 patients (13.3%; 95% CI 8.4%, 20.6%). Positive effects attributed to this formula were improved appetite, better sleep, relief of pain and 'a good blood test' (1 report of each). Adverse events experienced were weight loss, numbness, hot flush and 'blackened nails' (1 report of each). Reactions to other formulae taken by patients prior to their arrival were varied and are reported in Table 4.

3.2. Effects of the regime at Khampramong

Most patients (277/286; 96.9%) were first interviewed within 4 days of admission to Khampramong; the remaining 9/286 were long term residents and were interviewed at the start of the study (days 110–1078 of their admission). It was not possible to standardise the time

interval between interviews because the individual circumstances of each patient were different, including length of admission, and no interference of any kind with the patients or regime was permitted under the ethical approval conditions of the project. Instead, our hypothesis was that patients would experience some effect as a result of their visit to Khampramong, regardless of its overall length, and the resulting changes in symptoms were subjected to Chi-square tests for significance. The prevalence of specific symptoms at the first interview, and at the end of their admission (final interview) is shown in Fig. 2, and the percentage reduction in symptoms in Table 5. The percentage of patients reporting the 13 most common symptoms at first interview versus final interview showed a statistically significant reduction (χ^2 57.1, df 7, $p < 0.001$). Patients reported various types of pain in their own cultural terms (e.g. general pain as compared to pain associated with abdominal distension or dyspepsia), and these have been differentiated in our study.

4. Discussion

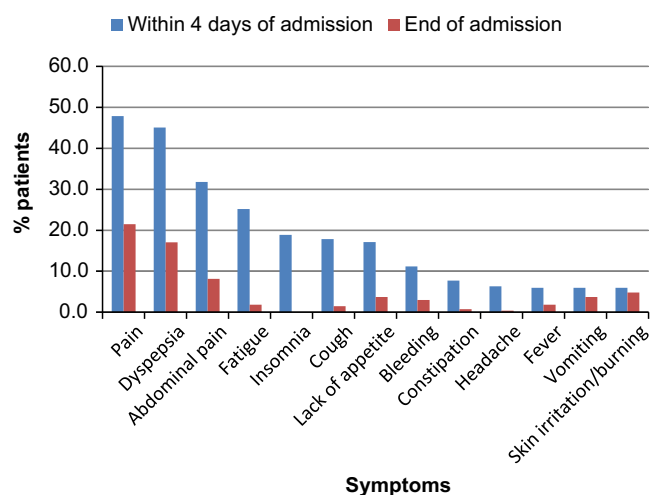
This is the first report of the range of traditional medicines taken by cancer patients in S.E. Asia, and in Thailand specifically, and their perceived effects as experienced by the patients themselves. There are many limitations to this type of study, which we were fully aware of, but in the absence of any real data as to what patients take on their own initiative (i.e., not under medical direction), a retrospective survey can provide a starting point for deciding the type of information which needs to be collected in the future. At present, risk assessments of TM practices used by cancer (and other) patients are difficult to make, because there is insufficient information available on positive and negative benefits of common products. In addition, TM normally involves a complex holistic regime, so it is not possible to attribute specific effects to any particular medicine. Thus there were two main

Table 4

Use and effects of herbal formulae used by patients for cancer related symptoms, before arriving at Khampramong.

Thai formula (with English translation)	No. (%; CI) of patients (n=120) reporting use	Indication (as cited)	Main benefits attributed (no. of patients reporting if > 1)	Adverse events (no. of patients)
Ya-tan-mareng (anti-cancer remedy, from province of)				
Singburi	16 (13.3%; 95% CI 8.4%; 20.6%)	Cancer	'Good blood test' (1), better sleep (1), improved appetite (1), less pain (1)	Weight loss (1), hot flush (1), 'black nails' (1), numbness (1)
Kanchanaburi	2 (1.7%; 95% CI 0.5%, 5.9%)	Cancer	–	Dry cough
Lopburi	2 (1.7%; 95% CI 0.5%, 5.9%)	Cancer	–	Dyspepsia/vomiting (1)
Pranchinburi	2 (1.7%; 95% CI 0.5%, 5.9%)	Cancer	–	Dyspepsia
Khonkhaen	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
Loei	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
Mukdahan	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	Weight loss
Nakhonnayok	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	More pain
Ongkhai	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	Diarrhoea
Roi Ed	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
Sakhonnakon	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	Smaller tumour mass	–
Sukhothai	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	Weakness
Udonthani	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
Ya-bum-rung (mixture of roots from province of)				
Bureerum	1 (0.8%; 95% CI 0.2%, 4.6%)	Nourishing	–	More swelling
Kalasin	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	–
Khonkhaen	1 (0.8%; 95% CI 0.2%, 4.6%)	Nourishing	Felt stronger	–
Sakon nakhon	1 (0.8%; 95% CI 0.2%, 4.6%)	Nourishing	–	Weight loss
Srisaket	2 (1.7%; 95% CI 0.5%, 5.9%)	Nourishing	Improved appetite (1) and strength (1)	–
Num-muk-chi-wa-pap ('bioextract of herbs')				
Unspecified recipes made at home or by local TM healers	12 (10%; 95% CI 5.8%; 16.7%)	Nourishing (6), cancer (2), pain (2), chemo (1), detox (1)	Relief of pain (2), better sleep (2), improved appetite (2), laxative (1)	–
Other miscellaneous individual formulae				
Ya-tan-mareng (cancer remedy of) Dr Air	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	Improved appetite	–
Ya samunpri (herbal remedy; Dr Somwang)	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	Weight loss
Phong-sa-mun-phai (herbal powder; Sakon Nakhon)	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	Smaller tumour mass	–
Ya-look-khon (herbal pills of Pathumthani)	1 (0.8%; 95% CI 0.2%, 4.6%)	Cancer	–	More swelling
Ya-look-khon (herbal pills; Ubonratchathani)	1 (0.8%; 95% CI 0.2%, 4.6%)	Pain relief	Pain relief	–

Number of patients reporting each event indicated in brackets, if more than one patient taking the remedy.

**Fig. 2.** Comparison of symptom prevalence reported at first interview and time of discharge.

aims of this study, the first being to build a picture of perceived benefits and harms of TM products by patients who had selected these remedies themselves, before coming to Khampramong, and the second to carry out a preliminary evaluation of the holistic treatment provided by the hospice. This was measured as a change in percentage of the most commonly reported symptoms between the beginning

and end of the patients' stay and expressed as a reduction in symptom burden.

Some important limitations are as follows: our patient population had chosen to attend Khampramong which specialises in the use of Thai traditional herbal medicine to manage their terminal cancer symptoms and as such may not be representative of other cancer sufferers and their experiences with TM. Survey studies rely on the recollection of patients and their opinions of cause and effect; however they may not always remember specific details of these. It must also be emphasised that these are reports of patients' own perceptions and are not corroborated by independent medical or laboratory tests. Finally, any observed symptom improvement cannot be definitively attributed to the herbs reported, even if the patients consider it to be so, because the temple regime is complex and cancer has very variable and changeable symptoms.

Nevertheless, some tentative conclusions can be drawn about the type of remedies taken by cancer patients in Thailand and also how they perceive the treatment at Khampramong. A significant percentage of patients (42.0%) had taken TMs before arriving at the temple to specifically treat their cancer, and they considered that these remedies had produced more benefit than harm. Although the use of highly toxic herbs is not extensive, there are dangers posed by the use of known cytotoxic herbs, and added risks of using formulae of unknown composition which cannot be assessed. Fewer animal products were used in Thailand than is generally the case in other forms of TM. However, the most common herb taken (*linzhi*, *Ganoderma lucidum*) is also very popular in TM in both China and Europe (Williamson et al., 2013). The pattern of use of TMs depends on many factors, including

Table 5

Percentage symptom reduction between first and final interviews.

Symptom	No. (%) of patients reporting within 4 days of admission (n=286)	No. (%) of reporting symptom at end of admission (n=270)	% reduction in symptom prevalence
Pain ^a	137 (47.9)	58 (21.5)	26.4
Dyspepsia	129 (45.1)	46 (17.0)	28.1
Visceral pain	91 (31.8)	22 (8.2)	23.6
Lack of appetite	49 (17.1)	10 (3.7)	13.4
Bleeding	32 (11.2)	8 (3.0)	8.2
Vomiting	17 (5.9)	10 (3.7)	2.2
Irritation and burn	17 (5.9)	13 (3.7)	2.2
Other	234 (81.8)	17 (6.3)	75.5

^a Pain was differentiated from visceral pain which was mainly due to a tumour in the abdomen. For the purposes of the chi-square, fatigue, insomnia, cough, constipation, headache and fever were grouped as "other".

price, availability and reputation, and cannot reflect efficacy of a particular product.

As far as benefits provided by the Khampramong regime are concerned, the reported symptoms will necessarily include physical manifestations of the disease, as well as psychological effects from being diagnosed with a terminal illness for which no further conventional treatment has been offered. Spiritual practices are an important part of the Thai way of life, and undoubtedly contribute to benefits provided by the temple. Music and laughter therapy and dancing have all been reported to reduce stress, measured as a reduction in cortisol levels (Uedo et al., 2004; Berk et al., 2008; Quiroga et al., 2009) but are unlikely to account for most of the physical effects. The significant reduction in symptom burden observed may or may not depend upon any anti-cancer effects of yod-ya-mareng or other herbal medicines, which could not be assessed by this study methodology. It is notable that as patients were about to leave the temple, they no longer reported feeling fatigued; however it is likely that the high level of fatigue reported soon after arrival was a consequence of a long and difficult journey to reach the temple and was alleviated at least partly by the restful environment there.

Patients did not usually comment on the effect of the remedies on the progression of their cancer and no attempt was made (or possible) to evaluate these. Symptomatic relief of pain and digestive discomfort were the main benefits noted, together with improvements in appetite and sleep patterns, all of which are likely to result in increased quality of life.

Preliminary in vitro work on the anti-cancer activities of the components of 'Yod-ya-mareng' has been carried out and cytotoxic, pro-apoptotic and other relevant effects noted for certain ingredients (e.g. Itharat et al., 2004; Itharat and Ooraikul, 2007; Sertel et al., 2011; Siripong et al., 2006; Siritwatanametanon et al., 2010; Tewtrakil et al., 2009). Some constituents of the formula 'Yat-tan-mareng Singburi' have also been investigated in vitro and found to have relevant biological effects (e.g. Yong et al., 2013; Roy et al., 2005; Mazzio et al., 2014). Notably, *Catharanthus roseus* is the source of the Vinca anticancer alkaloids such as vincristine and vinblastine, widely used for the treatment of lymphomas and leukaemias, but its suitability for incorporation into a herbal medicine for any type of cancer is another matter entirely.

5. Conclusions

Based on the evidence currently available, it is not possible to justify the use of traditional herbal medicine in cancer patients in general, but equally, it would be cruel to deny the opportunity for patients in the later stages of the disease to try TM. Our study shows that cancer patients report a significant reduction in symptoms after staying at Wat Khampramong, indicating an improvement in their quality of life, the aim of hospices

everywhere. Anecdotal evidence also suggests that the regime may delay the progression of the disease in some patients, and further work is in progress to evaluate its contribution to palliative care in cancer. As far as extending the use of this type of therapy is concerned, at present it would seem to be more feasible in Asian countries where TM already forms part of everyday life. In Europe, Australasia and the USA, cultural acceptance of TM is much lower and the possibility of drug interactions would be much greater, whereas the patients at Khampramong receive little or no conventional treatment and if so, it is mainly limited to pain relief, so their risk will be low. In summary, the uncontrolled use of TMs, and particularly formulae of unknown or unspecified composition, remains a concern. The other issue raised by this study is the absence of robust and validated methods available for assessing the value of complex holistic treatments. At present, researchers are wary of carrying out such studies due to criticism on the grounds of weak methodology. However, patients continue to take TMs, so this situation needs to be remedied in the interests of safety, and also to improve palliative care for cancer patients.

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