



Original Article

Professionals' experiences and attitudes toward use of Traditional Chinese Medicine in hospice palliative inpatient care units: A multicenter survey in Taiwan

Yu-Jia Lin ^{id a}, Hsiao-Ting Chang ^{id a}, Ming-Hwai Lin ^{id a}, Ru-Yih Chen ^{id b}, Ping-Jen Chen ^{id c}, Wen-Yuan Lin ^{id d}, Jyh-Gang Hsieh ^{id e}, Ying-Wei Wang ^{id e}, Chung-Chieh Hu ^{id f}, Yi-Sheng Liou ^{id f}, Tai-Yuan Chiu ^{id g}, Chun-Yi Tu ^{id h}, Yi-Jen Wang ^{id a}, Bo-Ren Cheng ^{id a}, Tzeng-Ji Chen ^{id a}, Fang-Pey Chen ^{id i}, Shinn-Jang Hwang ^{id a,*}

^a Department of Family Medicine, Taipei Veterans General Hospital, Taipei, Taiwan

^b Department of Family Medicine, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan

^c Department of Family Medicine, Kaohsiung Medical University Chung-Ho Memorial Hospital, Kaohsiung, Taiwan

^d Department of Family Medicine, China Medical University Hospital, Taichung, Taiwan

^e Department of Family Medicine, Hualien Tzu Chi Hospital, Hualien, Taiwan

^f Department of Family Medicine, Taichung Veterans General Hospital, Taichung, Taiwan

^g Department of Family Medicine, National Taiwan University Hospital, Taipei, Taiwan

^h Department of Family Medicine, Taipei Veterans General Hospital Taoyuan Branch, Taoyuan, Taiwan

ⁱ Center for Traditional Medicine, Taipei Veterans General Hospital, Taipei, Taiwan

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ABSTRACT

Background: Medical staff may have difficulties in using conventional medicine to manage symptoms among terminally ill patients, including adverse effects of the treatment. Traditional Chinese medicine (TCM) is regarded as a complementary or alternative medicine, and has been increasingly used in the field of palliative medicine in recent years. This study aimed to investigate the experiences and attitudes toward using TCM among palliative care professionals, and to provide preliminary information about its use in palliative care.

Methods: This was a cross-sectional survey study conducted in eight inpatient hospice wards in Taiwan between December 2014 and February 2016. The questionnaire was self-administered, and was analyzed with descriptive statistics including Pearson's Chi-square test and Fisher's exact test.

Results: A total of 251 palliative care professionals responded to the questionnaire, of whom 89.7% and 88.9% believed that the use of TCM could improve the physical symptoms and quality of life in terminally ill patients, respectively. Overall, 59.8% of respondents suggested that TCM had rare side effects, and 58.2% were worried that TCM could affect the liver and kidney function of patients. In total, 89.7% and 88.0% of professionals agreed there were no suitable clinical practice guidelines and educational programs, respectively, for TCM use in palliative care.

Conclusions: Most of the respondents agreed there was insufficient knowledge, skills-training, and continuing education on the use of TCM in terminally ill patients in Taiwan. These results show that to address patient safety considerations, guidelines about use of TCM in palliative care should be established.

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1. Background

Western medicine, based on biomedicine, is used in most mainstream healthcare today, but there are still many symptoms that it cannot resolve. Western medicine does not meet the needs of all patients,¹⁻³ and people's attitudes toward disease have gradually changed from passive acceptance of treatment to active health

* Corresponding author at: Department of Family Medicine, Taipei Veterans General Hospital, No. 201, Section 2, Shipai Road, Beitou District, Taipei 112, Taiwan.
E-mail address: sjhwang@vghtpe.gov.tw (S.-J. Hwang).

promotion.^{4,5} When conventional therapies do not offer sufficient symptom relief or when they produce additional adverse effects, patients may choose complementary and alternative medicine (CAM) products or services, especially at the last stage of life.⁶ This has prompted the vigorous development of CAM in the field of palliative medicine.⁷ When the patient is near the end of life, a series of end-stage symptoms of illnesses usually appear, including anorexia, nausea, vomiting, cachexia, constipation, delirium, dyspnea, or fatigue.^{8,9} Among these symptoms, fatigue is the most common symptom in the terminal stage of illnesses.⁹ Statistics from a previous study indicated that the prevalence of fatigue among terminally ill cancer patients is between 52% and 81%, and is associated with psychological distress, poor Karnofsky Performance Status, and dyspnea. These findings revealed that both physical and psychological factors have an impact on the manifestations of fatigue in terminally ill cancer patients.¹⁰

Interest in CAM has increased around the world, despite varying regional, cultural, and historical backgrounds.^{11–15} In the United States, approximately 40% of people have used CAM within the previous year,¹⁴ and this figure rises to 86.9% in Taiwan.¹⁶ Traditional Chinese medicine (TCM) a type of alternative medicine, has undoubtedly gained a foothold in the Chinese population. Originating approximately 5000 years ago, TCM has become a unique medical system in East Asia.^{17,18} Unlike Western medicine, TCM emphasizes integrated regulation and harmony of the body. In addition to pursuing inner balance of the human body, TCM attaches importance to the balance between the human body and the external environment. Based on the theories of yin and yang, and five elements and meridians, a variety of treatments have been developed, including Chinese herbal medicine, acupuncture, moxibustion, massage, food therapy, and physical exercise (e.g., shadow boxing).^{18–20} TCM used to treat symptoms such as pain, nausea and vomiting, and fatigue in terminally ill patients^{21,22}; and can also reduce the side-effects and complications caused by postoperative cancer, chemotherapy, and radiotherapy.^{23,24} It has therefore gradually gained attention in hospice palliative care.

The use of TCM, however, also raises some novel issues. First, the most obvious problem is the potential adverse drug effects of TCM and drug–drug interactions between TCM and Western medicine. There are a number of studies on related topics, but it is difficult to comprehensively analyze the pharmacological properties of Chinese herbal medicines.^{25–28} It is also not clear whether current education and training programs meet the needs of hospice palliative care professionals, or what obstacles and difficulties interfere with providing TCM in hospices. To understand the use and development of TCM in hospices, we therefore conducted a survey study in eight hospice palliative inpatient care units in Taiwan to analyze palliative care professionals' experiences of and attitudes toward TCM.

2. Methods

2.1. Study design

This study was a descriptive cross-sectional, nonexperimental research design. Before the start of the formal study, the institutional review board of each hospital gave ethical approval.

2.2. Settings and participants

The study was conducted in eight hospitals in Taiwan including Taipei Veterans General Hospital, Kaohsiung Veterans General Hospital, Chi Mei Hospital, China Medical University Hospital, Hualien Tzu Chi Hospital, Taichung Veterans General Hospital, National Taiwan University Hospital, and Taipei Veterans General Hospi-

tal Taoyuan Branch. All the institutions provide hospice inpatient care. Medical professionals working in the hospice inpatient wards were randomly recruited. The inclusion criteria for participation included professionals who (1) were age ≥ 20 years old, (2) had normal cognitive function, (3) were employees in at least one of the eight hospice palliative inpatient care units during data collection, and (4) agreed to participate in the research and gave informed consents. The sample size was estimated by a 95% confidence level with a confidence interval of 3.

2.3. Measurements

Participants' experiences of and attitudes toward TCM in inpatient hospice palliative care wards were evaluated by questionnaire. Before designing the questionnaire, we carried out a systematic review of TCM in hospice palliative care in both local and international journals, and reviewed relevant studies to establish the evidence base and effectiveness of TCM in the literature. We also held meetings with five experts in the fields of palliative care and TCM to design a preliminary form of the questionnaire. Before starting the formal survey, the questionnaire was pilot-tested by 20 participants, and adjusted and modified using the results to confirm its reliability and validity.

The questionnaire contained five components. The first investigated the frequency of use of common TCM including natural indigo powder, Zih-Yun-Gao, medicated oil extracted from goldenrod or *Centella asiatica*, liquorice extract juice, traditional Chinese herbal medicine, transcutaneous electrical nerve stimulation (TENS), acupuncture, and skin scraping or patting for the treatments of common symptoms including oral ulcer, wound care, soreness or abdominal discomfort, dry mouth, or other discomfort of terminally ill patients in inpatient hospices. The frequency of use was categorized into always, often, sometimes and never.

The second component of the questionnaire explored the views of hospice palliative care professionals on whether TCM can alleviate terminal patients' symptoms, including pain, breathlessness, oral ulcers, dry mouth, poor appetite, nausea or vomiting, abdominal distension, constipation, insomnia, dizziness, and cancer-related wounds. The responses were categorized into strongly agree, agree, disagree, strongly disagree, and neutral.

The third component assessed personal views on the use of TCM to treat terminally ill patients, including its effectiveness, safety, medical education, and related clinical practice guidelines. These responses were also categorized into strongly agree, agree, disagree, strongly disagree, and neutral.

The fourth component inquired about personal attitudes towards TCM, including whether they would refer patients to TCM professionals, or recommend the use of traditional Chinese herbal medicine, concentrated Chinese medicine granules, acupuncture, or chiropractic to terminally ill patients. The responses were always, often, sometimes, and never. Respondents were also asked about their levels of knowledge and experience of TCM, and whether they had concerns about the possible risks of TCM in hospice palliative care, such as medico-legal problems, deterioration in liver and kidney function, or discomfort from side effects.

The fifth component covered the demographic characteristics of hospice palliative care professionals, including gender, age, profession, marital status, years of clinical practice in hospital, years in hospice palliative practice, hours to participate in courses of TCM education, and experience of TCM in the past year. To determine whether there were associations between palliative care professionals with different demographic characteristics and differences in views on specific topics about TCM, we selected gender, age, marital status, years of clinical practice in hospital, years in hospice palliative care practice, TCM-related training, and self-experience as demographic variables with which to measure the difference

in the distribution of opinions on TCM. TCM topics which were explored included (1) clinical side effects caused by TCM; (2) TCM related education programs for palliative care in Taiwan; (3) clinical practice guidelines for TCM in palliative medicine in Taiwan; (4) attitudes toward traditional Chinese herbal medicine, concentrated Chinese medicine granules, acupuncture, and chiropractic for symptoms relief; (5) the deterioration in liver and kidney function caused by TCM; and (6) knowledge and experience of TCM.

2.4. Data collection

The questionnaire was anonymous and self-administered. The formal survey was carried out between December 2014 and February 2016 in each hospital.

2.5. Statistical analysis

Data were analyzed using SPSS 18.0 software (SPSS Inc., Chicago, Ill, USA). For descriptive statistics, Pearson's Chi-square test or Fisher's exact test were used for categorical variables. Fisher's exact test was used to compare the differences in the frequency of specific TCM, as well as perceptions and attitudes to TCM use among hospice palliative care professions. The distribution of demographic characteristics was analyzed using the chi-square test to explain the differences in proportion of "agree" or "ever". The median duration of clinical practice was 9.25 years in hospitals and four years in hospices, so we categorized experience into "10 years and above" and "below 10 years" for clinical practice in hospital and "four years and above" and "below four years" for hospice practice. The median age of participants was between 30 and 39 years old, so we divided the respondents into "40 years old and above" and "below 40 years old". A two-tailed P value (p) <0.05 was considered to show statistical significance.

3. Results

3.1. Demographic characteristics of participants

A total of 251 respondents completed the questionnaire with a response rate of 73.2%. The majority were women ($n = 202$, 80.5%). The largest age group was those aged 30–39 years old ($n = 102$, 40.6%), followed by less than 30 years old ($n = 73$, 29.1%). In total, 163 respondents (64.9%) were nursing staff and 73 (29.1%) were physicians. Nearly half of the respondents were married ($n = 113$, 45.0%). In total, 123 respondents (49.0%) had less than 10 years of clinical practice in hospital, 119 (47.4%) had more than 10 years, and 117 (46.6%) had less than four years; 133 (53.0%) had more than four years of experience in hospice practice. A total of 151 palliative care professionals had participated in educational courses about TCM (60.1%), 52 had attended more than eight hours of related courses (20.7%), 138 (55.0%) had practiced TCM in the past year, and 76 (30.3%) believed that personal TCM use had been effective. The detailed demographic characteristics of participants are shown in Table 1.

3.2. Professionals' experiences of the use of common TCM to alleviate symptoms

The most common form of TCM used in hospice palliative inpatient care unit was medicated oil extracted from goldenrod (*Solidago virgaurea*) or *Centella asiatica* to help relieve soreness or bloating among terminal patients (always 37.1%, often 37.5%, sometimes 17.1%). This was followed by acupressure, which was used by 88.4% (always 14.3%, often 34.7%, sometimes 39.4%). By contrast, only 12.8% of palliative care professionals had used natural indigo powder to treat oral ulcers in terminally ill patients (always

Table 1
Characteristics of palliative care professionals ($n = 251$).

Characteristics	n (%)
Sex	
Male	49 (19.5)
Female	202 (80.5)
Age (years)	
<30	73 (29.1)
30–39	102 (40.6)
40–49	55 (21.9)
≥ 50	18 (7.2)
Missing	3 (1.2)
Profession	
Physician	73 (29.1)
Nurse	163 (64.9)
Social worker	4 (1.6)
Clinical chaplain	2 (0.8)
Clinical psychotherapist	4 (1.6)
Others	5 (2.0)
Marital status	
Married	113 (45.0)
Others	138 (55.0)
Years of clinical practice in hospital	
<10 years	123 (49.0)
≥ 10 years	119 (47.4)
Unknown/unclear	9 (3.6)
Years in hospice palliative care practice	
<4 years	117 (46.6)
≥ 4 years	133 (53.0)
Unknown/unclear	1 (0.4)
Participate in courses of TCM education	
No	99 (39.4)
Less than 8 h < 8 h	99 (39.4)
More than 8 h ≥ 8 h	52 (20.7)
Unknown/unclear	1 (0.4)
Experience of TCM in the past year	
No	113 (45.0)
Yes, but it doesn't have much impact on me.	62 (24.7)
Yes, and it has an impact on me	76 (30.3)

TCM, traditional Chinese medicine.

0%, often 1.6%, sometimes 11.2%). The experiences of TCM use in hospice palliative care are shown in Table 2.

3.3. The opinion of palliative care professionals on the use of TCM for specific end-of-life symptoms

As shown in Table 3, most palliative care professionals ($n = 232$, 92.4%) agreed (including strongly agree and agree) that the use of TCM could relieve constipation in terminally ill patients, followed by abdominal distension ($n = 219$, 87.3%), dry mouth ($n = 216$, 86.1%), pain ($n = 210$, 83.7%), and nausea/vomiting ($n = 195$, 77.7%). In contrast, a total of 47 (18.8%), 46 (18.3%), and 34 (13.6%) palliative care professionals disagreed (including strongly disagree and disagree) that the use of TCM could relieve dizziness, dyspnea/shortness of breath, and cancer-related wounds, respectively.

3.4. Personal views about the effectiveness and safety of TCM among palliative care professionals

Table 4 shows the attitudes of hospice palliative care professionals on effectiveness, safety of TCM, education and information about its use in clinical diagnosis and treatment. In total, 89.7% and 88.9% of the respondents believed that TCM could improve the physical symptoms and quality of life, respectively. Of the respondents, 68.5% and 61.0% reported that TCM alleviated the side effects of chemotherapy and radiotherapy, respectively, and 50.6% that it could relieve acute discomfort. One hundred and sixty (63.8%) respondents agreed that TCM usually achieved a therapeutic effect after 5–7 days. Approximately 59.8% indicated that TCM-related complications were rare. A much larger proportion, 88.0%, said that

Table 2
Clinical experience of using TCM to treat terminal patients with specific symptoms among palliative care professionals (n = 251).

Use of TCM to treat terminal patients with specific symptoms (or with certain conditions)	Always n (%)	Often n (%)	Sometimes n (%)	Never n (%)	p value ^b
					< 0.001
Medicated oil extracted from Goldenrod or Centella asiatica (for soreness or abdominal distension)	93 (37.1)	94 (37.5)	43 (17.1)	21 (8.4)	
Acupressure	36 (14.3)	87 (34.7)	99 (39.4)	29 (11.6)	
TENS	32 (12.7)	84 (33.5)	100 (39.8)	35 (13.9)	
Liquorice extract juice (for dry mouth)	25 (10.0)	54 (21.5)	78 (31.1)	94 (37.5)	
Zih Yun Gao (for wound care)	20 (8.0)	61 (24.3)	104 (41.4)	66 (26.3)	
Skin scraping or patting	9 (3.6)	18 (7.2)	90 (35.9)	134 (53.4)	
Traditional Chinese herbal medicine ^a	7 (2.8)	23 (9.2)	92 (36.7)	128 (51.0)	
Natural indigo powder (for oral ulcer) ^a	0 (0)	4 (1.6)	28 (11.2)	218 (86.9)	

TCM, traditional Chinese medicine; TENS, Transcutaneous electrical nerve stimulation.

^a Unknown and unclear answers were excluded.^b Statistical analyses with Fisher's exact test.**Table 3**
Palliative care professionals' perceptions about the effects of using TCM for managing terminal patients' symptoms (n = 251).

I think the use of TCM could relieve specified symptoms according to my clinical experience.	Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly disagree n (%)	p value ^b
						< 0.001
Constipation	43 (17.1)	189 (75.3)	13 (5.2)	6 (2.4)	0 (0)	
Abdominal distension	37 (14.7)	182 (72.5)	16 (6.4)	14 (5.6)	2 (0.8)	
Dry mouth	31 (12.4)	185 (73.7)	27 (10.8)	8 (3.2)	0 (0)	
Pain	25 (10.0)	185 (73.7)	23 (9.2)	17 (6.8)	1 (0.4)	
Nausea/vomiting	25 (10.0)	170 (67.7)	34 (13.5)	21 (8.4)	1 (0.4)	
Cancer-related wound	24 (9.6)	145 (57.8)	48 (19.1)	31 (12.4)	3 (1.2)	
Oral ulcer	23 (9.2)	163 (64.9)	44 (17.5)	21 (8.4)	0 (0)	
Insomnia	22 (8.8)	163 (64.9)	37 (14.7)	29 (11.6)	0 (0)	
Poor appetite	22 (8.8)	162 (64.5)	41 (16.3)	25 (10.0)	1 (0.4)	
Dizziness ^a	15 (6.0)	122 (48.6)	66 (26.3)	47 (18.7)	0 (0)	
Dyspnea/breathlessness	14 (5.6)	140 (55.8)	51 (20.3)	45 (17.9)	1 (0.4)	

TCM, traditional Chinese medicine.

^a Unknown and unclear answers were excluded.^b Statistical analyses with Fisher's exact test.**Table 4**
Palliative care professionals' points of view toward TCM in treating terminal patients (n = 251).

	Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly disagree n (%)	p value ^b
						< 0.001
Effectiveness						
Improvement of physical symptoms ^a	24 (9.6)	201 (80.1)	16 (6.4)	7 (2.8)	1 (0.4)	
Improvement of quality-of-life ^a	29 (11.6)	194 (77.3)	17 (6.8)	9 (3.6)	0 (0)	
Reduction of chemotherapy-related side effects ^a	15 (6.0)	157 (62.5)	52 (20.7)	25 (10.0)	0 (0)	
Reduction of radiotherapy-related side effects ^a	13 (5.2)	140 (55.8)	63 (25.1)	32 (12.7)	1 (0.4)	
Effective treatment of acute discomfort symptoms ^a	5 (2.0)	122 (48.6)	52 (20.7)	65 (25.9)	5 (2.0)	
Usual achievement of therapeutic effect after 5–7 days ^a	10 (4.0)	150 (59.8)	49 (19.5)	36 (14.3)	3 (1.2)	
Safety						
Rarely cause clinical side effects ^a	16 (6.4)	134 (53.4)	47 (18.7)	48 (19.1)	4 (1.6)	
Medical education						
Lack of related educational programs in Taiwan ^a	61 (24.3)	160 (63.7)	17 (6.8)	9 (3.6)	2 (0.8)	
Guidelines for treatment						
Lack of related clinical practice guidelines in Taiwan ^a	81 (32.3)	144 (57.4)	16 (6.4)	6 (2.4)	1 (0.4)	

TCM, traditional Chinese medicine.

^a Unknown and unclear answers were excluded.^b Statistical analyses with Fisher's exact test.

there were insufficient TCM-related educational programs in the field of hospice palliative care in Taiwan, and 89.7% suggested that Taiwan lacked TCM-related clinical practice guidelines for terminally ill patients.

3.5. Personal attitudes toward TCM among hospice palliative care professionals

Table 5 shows the attitudes towards recommending specific TCM or referring patients to TCM professionals for control of their

symptoms, and concerns about TCM use. In total, 58.6%, 59.8%, 70.1%, and 60.2% of the respondents individually had (including always, very often, and sometimes) recommended or referred terminally ill patients to use traditional Chinese herbal medicine, concentrated Chinese medicine granules, acupuncture, and chiropractics, respectively, for symptoms relief. Over half (58.2%) of the respondents had been worried that TCM might worsen liver and kidney function; and 45.4% had concerns about medico-legal problems caused by offering TCM to terminally ill patients. A total of

Table 5

Personal attitudes toward complementary therapy with TCM among palliative care professionals (n = 251).

	Always n (%)	Very often n (%)	Sometimes n (%)	Never n (%)	p value ^b < 0.001
Recommendation or referral of patients for symptoms relief					
Traditional Chinese herbal medicine ^a	6 (2.4)	29 (11.6)	112 (44.6)	102 (40.6)	
Concentrated Chinese medicine granules ^a	6 (2.4)	37 (14.7)	107 (42.6)	99 (39.4)	
Acupuncture ^a	10 (4.0)	51 (20.3)	115 (45.8)	73 (29.1)	
Chiropractic ^a	6 (2.4)	51 (20.3)	94 (37.5)	98 (39.0)	
Concerns related to TCM					
Medico-legal problems ^a	12 (4.8)	33 (13.1)	69 (27.5)	135 (53.8)	
Deterioration in liver and kidney function ^a	13 (5.2)	54 (21.5)	79 (31.5)	103 (41.0)	
Discomfort causing by the side effects of TCM ^a	9 (3.6)	33 (13.1)	113 (45.0)	94 (37.5)	
Own knowledge					
Lack of related knowledge and experience of TCM ^a	67 (26.7)	106 (42.2)	55 (21.9)	17 (6.8)	

TCM, traditional Chinese medicine.

^a Unknown and unclear answers were excluded.^b Statistical analyses with Fisher's exact test.

90.8% believed that they lacked TCM-related knowledge and experience.

3.6. Differences in TCM use and point of view by demographic characteristics of respondents

Table 6 shows TCM use by gender, age, marital status, years of clinical practice in hospital, years in hospice palliative care practice, TCM-related training, and self-experience. Female professionals were more willing to recommend and refer patients for TCM treatment (concentrated Chinese medicine granules, $p=0.029$; acupuncture, $p=0.008$; chiropractic, $p=0.034$). The length of practice was also related to willingness to recommend and refer patients for TCM. Palliative care professionals with ≥ 10 years of clinical practice in hospital and ≥ 4 years of hospice palliative care practice were more willing to recommend and refer patients for prescription of traditional Chinese herbal medicine ($p=0.017$; $p=0.008$) and concentrated Chinese medicine granules ($p=0.022$ and $p=0.034$). Participation in TCM-related educational courses was also significantly associated with recommendation and referral of patients for prescription of traditional Chinese herbal medicine ($p=0.009$) and concentrated Chinese medicine granules ($p=0.008$). There were differences between most demographic factors (except marital status) on the impairment of liver and kidney function following TCM use ($p<0.05$). However, there were few significant differences by demographic characteristics on rare clinical complications of TCM, except for those who had participated in training courses on TCM ($p=0.005$). Finally, there was no significant correlation between professionals with different demographic characteristics and views on topics including lack of related educational programs and clinical practice guidelines in Taiwan, as well as lack of knowledge and experience of TCM.

4. Discussion

To the best of our knowledge, this is the first study to survey palliative care professionals' experiences and attitudes toward TCM use in palliative care inpatient units. Most of the respondents believed that TCM can improve physical symptoms and quality of life of terminally ill patients, and are willing to try TCM. However, its use is limited by internal and external obstacles, such as lack of sufficient experience and knowledge of TCM; concern about potential side effects, liver and kidney function damage, exacerbation of discomfort, or medico-legal disputes; shortage of educational resources on TCM; and lack of widely-accepted clinical practice guidelines for terminally ill patients care. The use of TCM in palliative medicine therefore still faces problems and challenges.

The results of this study disclosed that nearly 90% of respondents believed TCM combined with conventional medicines may improve the physical symptoms and quality of life among terminally ill patients. Our findings are similar to the conclusions in previous literature: palliative care professionals have a high degree of acceptance and interest toward CAM therapy in palliative care.^{29,30} However, the high acceptance of TCM in palliative care does not mean that all TCMS are often used for terminally ill patients. Our study found that the frequency of use of different types of TCMS varied significantly. Nearly three-quarters of palliative care professionals frequently use medicated oil extracted from goldenrod or *Centella asiatica* as an adjunct treatment to relieve bloating and soreness, whereas more than four-fifths of palliative care professionals have never used natural indigo powder to relieve oral ulcers. Medicated oil extracted from goldenrod (*Solidago virgaurea*) or *Centella asiatica* has been reported to have anti-inflammatory and analgesic effects; its anti-inflammatory mechanism is mainly from reduction in the secretion of pro-inflammatory mediators including TNF- α and IL-1 β .^{31,32} In contrast, the use of natural indigo powder for relieving oral ulcers has not been confirmed by current studies. The previous literature pointed out that the degree of understanding of the therapy, past experience, and whether there is sufficient information about its safety and effectiveness are the main considerations for health providers when choosing to use a specific CAM.³³

On the other hand, approximately 60% of respondents believed that side effects of TCM are rare, but a similar proportion were concerned that TCM may affect the liver and kidney function of patients based on our findings. In fact, other research has demonstrated that side effects of TCM were rare in clinical practice; however, there were concerns about potential adverse reactions to TCM because of the unclear pharmacological properties and precautions for the use of traditional Chinese herbs.³⁴ Chinese herbal medicine is one of the most common form of TCM, but some literature has indicated the potential risks of Chinese herbs. Cosyns reported that Chinese herbs containing aristolochic acid have been proven to have nephrotoxicity, and easily induce interstitial fibrosis and upper urothelial malignancy.³⁵ McRae et al. indicated that hepatitis associated with Chinese herbs often involves two products, Jin bu huan and *Dictamnus dasycarpus*.³⁶ Mizushima et al. demonstrated that pneumonitis induced by herbal drugs were mainly caused by shosaikoto, and found a pattern of diffuse interstitial pneumonitis on chest X-ray films.³⁷ Enomoto et al. also revealed that in most patients, herbal medicine-induced pneumonitis was caused by shosaikoto (26%), followed by saireito (16%), renshiin (8%), and bofutsushosan (8%). The pattern of the above herbal-induced pneumonitis is similar to interstitial lung diseases.³⁸

Table 6
Differences of palliative care professionals' point of view on TCM by demographic characteristics.

Characteristics	Rarely cause clinical side effects	Lack of related educational programs in Taiwan	Lack of related clinical practice guidelines in Taiwan	Recommendation and referral of patients for symptoms relief				Concern for deterioration in liver and kidney function	Lack of related knowledge and experience of TCM
	Agree (%)	Agree (%)	Agree (%)	Traditional Chinese herbal medicine Ever (%)	Concentrated Chinese medicine granules Ever (%)	Acupuncture Ever (%)	Chiropractic Ever (%)	Ever (%)	Ever (%)
Total (n = 251)	59.8	88.0	89.6	58.6	59.8	70.1	60.2	58.2	90.8
Sex (n = 251)									
Male	51	89.8	93.9	61.2	73.5	85.7	73.5	71.4	93.9
Female	61.9	87.6	88.6	57.9	56.4*	66.3**	56.9*	55.0*	90.1
Age (years) (n = 248)									
<40	61.1	86.3	89.1	54.9	56.6	69.1	55.4	63.4	91.4
≥40	56.2	91.8	91.8	65.8	65.8	72.6	69.9*	46.6*	90.4
Marital status (n = 251)									
Married	60.2	87.6	89.4	65.5	69.0	79.6	70.8	56.6	92.0
Others	59.4	88.4	89.9	56.5*	52.2**	62.3**	51.4**	59.4	89.9
Years of clinical practice in hospital (n = 242)									
Below 10 (<10)	56.1	86.2	86.2	51.2	52.8	65.9	55.3	66.7	91.1
10 and above (≥10)	65.5	90.8	93.3	66.4*	67.2*	74.8	63.9	50.4*	91.6
Years in hospice palliative care practice (n = 250)									
<4	58.1	84.6	88.0	49.6	53.0	64.1	58.1	70.1	89.7
≥4	61.7	91.0	91.0	66.2**	66.2*	75.2	61.7	47.4***	91.7
Participate in courses of TCM education (n = 250)									
None	47.5	82.8	84.8	47.5	49.5	65.7	53.5	70.7	93.9
Yes, less than 8 h (<8 h)	69.7	93.9	91.9	63.6	62.6	71.7	61.6	52.5	91.9
Yes, more than 8 h (≥8 h)	63.5**	88.5	94.2	71.2**	75.0**	76.9	71.2	46.2**	82.7
Experience of TCM in the past year (n = 251)									
Nil.	53.1	85	85.8	50.4	53.1	64.6	54.0	68.1	92.9
Yes, but it doesn't have much impact on me.	62.9	91.9	88.7	67.7	69.4	74.2	56.5	53.2	90.3
Yes, and it has an impact on me	67.1	88.2	94.7	63.2	61.8	75	72.4*	47.4*	88.2

TCM, traditional Chinese medicine.

* Statistically significant with Chi-square test, $p < 0.05$.

** Statistically significant with Chi-square test, $p < 0.01$.

*** Statistically significant with Chi-square test, $p < 0.001$.

Many studies have also suggested that Chinese herbs may interact with other Chinese herbs or conventional Western medicines, and that this might harm terminally ill patients if inappropriately used.^{39–44} However, there is inadequate knowledge on the interaction of Chinese herbal medicines with others. Many Chinese herbal medicines have not been well studied in basic and clinical pharmacological studies, and only a few have been covered by systemic reviews.⁴⁵ Nevertheless, we found concerns about liver and kidney function damage were significantly reduced for professionals who have been in hospice practice more than four years or received more TCM courses. Though many Chinese herbal medicines are currently in off-label use because of an insufficient level of evidence, palliative care professionals can still construct their points of view and values for the use of TCM through past clinical experience, which can be supplemented by TCM knowledge. A report by Mahmood documented that practical experience is itself a way of acquiring knowledge, and that about half of the physicians obtain their knowledge from experience.³³

Knowledge developed through experience, however, has its limitations. Our research showed that most (90.8%) palliative care professionals believed they lack sufficient knowledge or experience of TCM, and the deficiency of knowledge or experience cannot be significantly improved by hospice palliative care practice. Up to 88.0% of the palliative care professionals in our study agreed that TCM-related educational programs and postgraduate courses in the palliative care field are insufficient in Taiwan, and that participating in TCM courses presently does not effectively enhance their own knowledge and experience of TCM. At present, TCM education programs and training models in Taiwan only focus on Chinese medicine-trained doctors and a few dual-degree doctors who have been trained in Western and Chinese medicine. The training of Western physicians is mostly Western medicine oriented, and it is easy to ignore the basic principles and latest developments of TCM.⁴⁶ Official information by Taiwan Ministry of Health and Welfare demonstrated that more than 350 Chinese medicine-trained doctors and dual-degree doctors receive comprehensive Chinese medical education and training annually.⁴⁷ Item 2, Article 8 of the Taiwan Physicians Act states that Chinese medicine physicians should receive continuing education during clinical practice and must complete the appropriate certification every six years,⁴⁷ but there is no similar requirement for other healthcare professionals. Prior investigations have demonstrated that palliative care professionals who have mainly been trained in Western medicine often feel frustrated when using TCM for palliative care or in response to inquiries from patients and family members because of their deficiency of knowledge or practice skills in TCM.^{48,49} Policy makers should develop legislation to regulate TCM providers in hospice, such as developing a suitable certification system or improving the curriculum design of undergraduate and postgraduate education. The curriculum should be designed to provide education about common uses of TCM in hospice palliative care, as well as the potential risks and ethical issues arising from TCM use, so that terminally ill patients can obtain this treatment if necessary.

Results from our study indicated that palliative care professionals generally agreed there is a shortage of TCM-related clinical practice guidelines for hospice palliative care in Taiwan regardless of demographic characteristics. Looking across domestic and international palliative care guidelines, the Scottish palliative care guidelines and the National Comprehensive Cancer Network (NCCN) guidelines for palliative care mentioned that acupuncture or acupressure can relieve the symptoms of nausea and vomiting in terminally ill patients.^{50,51} In order to cope with the increasing number of new cases of cancer and death attributed to cancers, the Hong Kong government entrusted the Hospital Authority to initiate a project called “Integrated Chinese–Western Medicine Pilot Program” in 2014. Subsequently, the Hong Kong Baptist Univer-

sity completed a clinical practice guideline for TCM that could be applied in the field of cancer palliative care.^{52,53} However the items and forms of CAM use often depend on national culture and local traditions.⁵⁴ Gyasi et al. found that values and socio-cultural contexts, including spirituality, religious, customs, and personal beliefs and philosophies, play an important role in molding the use of traditional medicine.⁵⁵ Considering the diversities of treatment strategies and differences in custom or tradition, the Ministry of Health and Welfare in Taiwan should develop a practical guideline based on local circumstances and provide information to professionals by grading of recommendations and levels of evidence, to assist palliative care professionals in the safer use of TCM, and reduce the potential for hazards or drug interactions.

This study’s strength is its multicenter study design, involving hospice palliative inpatient wards in eight hospitals in the northern, middle, southern, and eastern regions of Taiwan. The results of this study are therefore likely to be generalizable and representative of palliative care professionals, especially nurses and physicians, in other hospice palliative care inpatient wards in Taiwan. However, the study also had some limitations, so the results should be interpreted carefully. First, the response rate was high, but there may still be respondent bias. Respondents who strongly agree or disagree with TCM may be more inclined to respond to the questionnaire. Second, only a few social workers, clinical chaplains, and clinical psychotherapists were involved in this study, so the results may not be applicable to these professionals. Third, cancer-related fatigue is also important in palliative care, but we did not include this topic in the questionnaire. This topic should be included in further research.

In conclusion, the results of this study showed that palliative care professionals have a positive attitude towards the integration of TCM in palliative medicine. In order to assist professionals to more comprehensively, safely and conveniently understand and apply TCM to terminally ill patients in inpatient hospices, policy makers should establish institutionalized education, training models, and a certification system for TCM, and formulate tailored TCM-related clinical practice guidelines for palliative care. These strategies will help to institute a hospice palliative inpatient care framework, and improve the welfare of terminally ill patients. More research is, however, needed to validate the results of this study.

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Author contributions

Conceptualization, Methodology, and Validation: HTC, MHL, TJC, FPC, and SJH. Formal Analysis: YJL, HTC, YJW, BRC. Investigation: HTC, RYC, PJC, WYL, JGH, YWW, CCH, YSL, TYC, CYT. Data curation: YJL, HTC. Writing - original draft: YJL, HTC. Writing - review & editing: HTC, SJH. Supervision: HTC, SJH. Funding Acquisition: SJH. All authors reviewed and approved the final version of this manuscript.

Conflict of interest

The authors declare no conflict of interest.

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Ethical statement

This study was approved by the institutional review board of each hospital (Taipei Veterans General Hospital and Taoyuan Branch IRB approval No.: 2014-07-005C, Kaohsiung Veterans General Hospital IRB approval No.: VGHKS16-CT2-02, Chi Mei Hospital IRB approval No.: 10511-001, China Medical University Hospital IRB approval No.: NA/CMHU105-REC1-118, Hualien Tzu Chi Hospital IRB approval No.: IRB106-23-B, Taichung Veterans General Hospital IRB approval No.: SE15302A, National Taiwan University Hospital IRB approval No.: 201510020RINB). All participants signed the informed consent form before participation.

Data availability

All datasets that support the findings of this study are available from the corresponding author on reasonable request.

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