Original Research Article

# Mapping the clinical practice of traditional, complementary and integrative medicine in oncology in Western countries: A multinational cross-sectional survey

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## ARTICLE INFO

## ABSTRACT

*Background:* Many cancer patients seek adjunctive therapies to biomedical cancer treatments at some point of their disease trajectory. While acupuncture is increasingly recommended by leading oncological associations, limited evidence exists concerning the evidence-informed practice and adherence to current guidelines of traditional complementary and integrative medicine (TCIM) practitioners treating cancer patients.
*Methods:* An international online-survey assessed the demographic data, clinical practice, and sources of information used by TCIM practitioners in Austria, Germany, United States of America, Australia, and New Zealand.
*Results:* In total, 404 respondents completed the survey, of which 254 (62.9%) treated cancer patients. Most practitioners were acupuncturists and herbalists (57.1%), had (16.8 ± 9.9) years of clinical experience and see a median of 2 (1, 4) cancer patients per week. Breast cancer (61.8%) is the most common cancer type seen in TCIM clinics. Adjunctive TCIM treatments are frequently concurrent with the patient's cancer specific treatment (39.9%), which is also reflected by the main goal of a TCIM treatment to alleviate side effects (52.4%). However, only 28.0% of the respondents are in contact with the treating oncologist. According to the respondents, pain is most effectively treated using acupuncture, while herbal medicine is best for cancer-related fatigue. TCIM practitioners mostly use certified courses (33.1%) or online databases (28.3%) but often believe that experts are more reliable to inform their practice (37.0%) than research publications (32.7%).
*Conclusion:* Acupuncturists and herbalists commonly treat cancer patients. Most practitioners use TCIM as an adjunct to biomedicine as supportive care and use it largely in accordance with current oncological guidelines.
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## 1. Introduction

Traditional complementary and integrative medicine (TCIM) is increasingly used worldwide as adjunctive therapy in cancer care [1]. TCIM includes all health practices and theories which are based on the cultural background or which are not fully integrated into

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the public healthcare system of a country [2,3]. Within TCIM, acupuncture is the most commonly used therapeutic modality [4]. Research over the past several decades has helped establish a sound evidence base, supporting further integration of TCIM, especially of acupuncture, into oncology and palliative care [1,5,6]. Current guidelines support the use of acupuncture for the management of disabling symptoms like cancer pain, nausea, vomiting and cancer-related fatigue, and for improving the quality of life of cancer patients [7–11]. The treatment of cancer pain in particular is one of the most investigated indications for acupuncture, showing a decrease in pain intensity and reduction of opioid dosage [12]. Therefore, integrating acupuncture into cancer care may further help to improve the supportive and palliative care of cancer patients in general.

However, no comprehensive real-world evidence of the clinical practice of integrative oncology care currently exists, making it hard to judge whether TCIM practitioners adhere to the indications suggested in clinical guidelines for symptom control in oncology. Furthermore, education and licensing/registration in acupuncture differ radically among countries, ranging from short-term training to requiring a university level degree [2]. Additionally, some countries require acupuncturists to study biomedicine, while others allow non-academically trained practitioners to perform acupuncture after appropriate training [13–16]. Hence, there may be differences in research literacy depending on the educational background of acupuncturists, potentially limiting the incorporation of research findings and clinical guidelines into their clinical practice.

From the patient's perspective, multiple factors influence the selection of TCIM, including age, gender, personal beliefs, and previous experiences with TCIM [17–20]. While patients have interest in, explore, and value the scientific evidence behind TCIM, they also accept non-research-based information, including expert opinions and anecdotal evidence, as "proof" equivalent to randomized clinical trials or systematic reviews [21,22]. Up to 95% of cancer patients use TCIM at some point during their disease trajectory, but only 20% to 70% discuss their use with their treating oncologist [23]. Hence, TCIM practitioners often bear the sole responsibility of informing patients about possible interactions and risks of TCIM. It is, therefore, of critical importance that TCIM practice reflects the current state of the evidence.

This survey assesses the clinical practice of TCIM practitioners focusing on acupuncture and herbal medicine in oncology in Austria, Germany, the United States of America (USA), Australia and New Zealand and compares the results against the current evidence supporting the use of acupuncture and herbal medicine within oncology. The results will guide future educational programs for acupuncturists and herbalists to further improve integrative cancer care.

## 2. Methods

### 2.1. Participants and survey distribution

We invited TCIM practitioners in Austria, Germany, USA, Australia, and New Zealand to participate in this study. Invitations were distributed through social media and emails between October 2022 and December 2022 by professional organizations representing acupuncture and Chinese medicine, including the Österreichische Gesellschaft für kontrollierte Akupunktur (OGKA, Austria), Wiener Schule für Traditionelle Chinesische Medizin (WSTCM, Austria), Arbeitsgemeinschaft für Klassische Akupunktur und Traditionelle Chinesische Medizin (AGTCM, Germany), Soci-

etas Medicinae Sinensis (SMS, Germany), American Society of Acupuncturists (ASA, USA), Hospital Handbook Project (HHP, USA), National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM, USA), Australian Acupuncture and Chinese Medicine Association (AACMA, Australia), and Acupuncture New Zealand (Acupuncture NZ, New Zealand). Participants were eligible if they were 18 years or older, were able to read and speak English or German, and were currently living and practicing in Austria, Germany, USA, Australia, or New Zealand. They also had to hold a valid license to perform acupuncture, herbal medicine, or both. The survey data were collected and managed using the Research Electronic Data Capture (REDCap) online survey and distribution tool hosted by the Medical University of Graz, Austria [24,25]. The survey was open from October 1st, 2022 to January 15th, 2023. The local ethics committee approved the study (Ethics Committee of the Medical University of Graz, Austria; document number 34-432 ex 21/22).

### 2.2. Survey design

We designed an anonymous self-completion questionnaire collecting data about the participating practitioners' demographics and clinical practice of integrative oncology. The questionnaire included open and closed questions in single-choice or free-text response format. Demographic data describing the diversity of the participants included profession, age, place of residence, education level, education and continuing training in acupuncture/herbal medicine, place of practice, experience in years, and average patient volume per week. Questions about oncological practice included the type and stage of cancer treated most often, time of first patient contact, patients' reasons for consultation, most common symptoms they treat, and, to their knowledge, which symptoms are best treated by acupuncture or herbal medicine. Further questions explored contact and information exchange with the treating oncologist and if acupuncture or herbal medicine is often combined with other treatments considered TCIM. Finally, if practitioners did not or stopped treating cancer patients, they were asked why they made this choice. The questionnaire was designed in English and then translated to German using the forward-backward-translation process by three native speakers. After reviewing the final two versions, both language versions were piloted by 10 German or English-speaking TCIM practitioners. Minor formatting and editing changes were made after receiving the piloting feedback.

### 2.3. Data analysis

The survey data was exported from the REDCap system to RStudio ("Ghost Orchid" Release, R version 4.0.3, Posit public-benefit corporation [PBC]). All questionnaires with less than 30% missing data were included, and missing data were reported. Descriptive statistics included mean ± standard deviation, or numbers and percentages. In addition, 95% confidence intervals (CIs) were used where appropriate. For bivariate analysis, we used student's $t$-test using a significance level of $P < 0.05$. We did not use imputation methods to replace missing data. All analyses and plotting were performed using R.

A qualitative descriptive approach was used to analyze the data for open-ended questions related to the reasons for not treating cancer patients. Meaning units were first condensed into codes and grouped into categories by similar patterns. This process was discussed and reviewed by all authors.

# 3. Results

## 3.1. Demographics

The survey was sent to 43,695 email and social media contacts by the participating professional organizations. In total, 742 TCIM practitioners responded to the questionnaire (response rate 1.7%) of which 404 responses fulfilled the criteria for inclusion in further analysis. Among the responses included in this analysis, 254 (62.9%) TCIM practitioners treated cancer patients; 145 (57.1%) hold a license for both acupuncture and herbal medicine; 60 (23.6%) were medical doctors; 207 (81.5%) had completed an education at university level; and 92 (36.2%) were 46–55 years old. There were differences among countries regarding the proportion of medical doctors and highest completed educational levels of TCIM practitioners.

Austria had the highest proportion of medical doctors providing TCIM services (100%), followed by Germany (18.6%). Among all countries, the majority of practitioners had achieved at least a university level education, but Germany had the largest proportion of TCIM practitioners holding a high school diploma as their highest educational degree. Most respondents had a diploma that included over 100 hours training in acupuncture (48.8%) or herbal medicine (25.6%), and 35.0% had completed oncology focused training. There were also differences between countries in relation to the specific training in acupuncture or herbal medicine, with the highest proportion of TCIM practitioners holding a masters' degree or doctor of philosophy practicing in USA (55.4% and 15.7%, respectively). The majority of respondents (74.4%) practice in their own solo clinic and only 12.6% work in a clinic focused on treating cancer patients. To inform their clinical practice, most attend continued professional education courses (33.1%), followed by conducting research using online databases (28.3%), which were rated as the most reliable source of information (from experts 37.0% or research papers 32.7%). Full demographics are outlined in Table 1. Additionally, the demographic data of TCIM practitioners who do not treat cancer patients are reported as supplementary material (Supplementary Table 1).

## 3.2. Clinical experience and practice

Years of practice differed significantly from years of treating patients with cancer (mean difference = 4.19, 95% CI [3.40–4.98], $P < 0.001$). However, with median of 2 (1, 4) cancer patients seen per week, the frequency is still low compared to the total weekly number of patients (median 25 [15, 40]). TCIM practitioners are mostly consulted by breast cancer patients (61.8%) in various cancer stages and mainly at the start of (39.8%) or in between cancer specific treatment sessions (33.1%). According to the survey respondents, the most common reason for consultation is "to alleviate side effects of cancer treatment" (52.4%), followed by "to strengthen their body during cancer treatment" (28.7%). Only 6.7% stated that their patients' primary goal was "to cure their cancer." The majority of respondents (64.6%) use a combination of TCIM therapies and other modalities considered to be complementary medicine.

The most common side effects of tumor-specific treatments seen by TCIM practitioners are "fatigue/drowsiness" (21.7%), "pain" (16.1%), and "depression/anxiety" (7.5%). When asked which symptom is treated most effectively using acupuncture, 34.3% stated "pain" followed by "nausea/emesis" (21.3%) and "depression/anxiety" (20.1%). This rating differed for herbal medicine, which was reported to be more effective for "fatigue/drowsiness"

(22.4%), "constipation" (7.1%), "depression/anxiety" (6.7%), and "sleep problems" (6.7%). While it is uncommon (28.0%) for respondents to be in contact with their patients' treating oncologist, those who are, frequently share information about their TCIM treatment (64.8%) and do so using a mixture of TCIM and scientific terminology (46.5%). Full information about the respondents' clinical experience and practice can be found in Tables 1 and 2.

## 3.3. Reasons for not treating cancer patients

In total, 150 TCIM practitioners (37.1% of the total respondents) stated that they do not treat cancer patients, and almost half of those (47.3%) described their reasons in detail. Demographical data about practitioners who do not treat cancer patients are reported as supplementary material (Supplementary Table 1). Using qualitative text analysis, 6 categories of reasons were identified: "time issues," "no referrals," "other clinical focus," "missing experience," "personal reasons," and "concerns."

"I am specialized in fertility treatment and pain relief. If I were to treat oncology patients, I would need further training and I do not know if I have the mental strength to handle oncology patients. I had only one patient in 7 years. It was quite a challenge but in the end it went well."—Germany, acupuncturist and herbalist, age 56–65 years old.

"No local demand or referral mechanism. I will occasionally treat people undergoing chemotherapy or radiotherapy for symptoms like nausea, but these are casual referrals rather than from the nearest oncology center which is 30 km away and fairly conservative."—Australia, acupuncturist and herbalist, age 56–65 years old.

"I treated my father with oncology-related symptoms and through his treatments; however, did not feel that the training in my degree covered anything specific to this and the medications—so just focused and treated the pattern(s) that presented at the time. Would like to have had more training in this area. In Australia, I think that access to acupuncturists is an issue. I know that my father would have taken up this option if offered within the hospital setting or within his at-home palliative care team."—Australia, acupuncturist, age 46–55.

Just over half (50.7%) of the respondents stated that the main reason for not seeing patients with cancer in their clinics was due to having no referrals, while almost one third (31.0%) focus their clinical practice on other conditions. Reasons for not treating cancer patients also related to lack of both clinical experience and training in oncology (18.3%), as well as personal reasons (7.0%), and concerns about interactions with cancer-specific conventional interventions (9.9%). The original responses are reported as supplementary material (Supplementary Table 2).

# 4. Discussion

To our knowledge, our study is the first multinational survey among TCIM practitioners that investigated the clinical practice of acupuncture and herbal medicine in cancer care. Treating cancer patients as an adjunct to biomedical treatment is common among TCIM practitioners, with the focus of the treatment being supportive and palliative care rather than treating the cancer itself. Interestingly, according to our findings, the most common type of cancer TCIM practitioners' see in their clinics is breast cancer. Molassiotis et al. [17] found young women to be more likely to use TCIM than men, which could explain the high proportion of breast cancer patients reported in our survey [4]. However, patients consult TCIM practitioners at all tumor stages and do so

**Table 1**
Demographics of survey respondents by country.

| Variable | Austria (n = 38) | Germany (n = 70) | United States of America (n = 83) | Australasia (n = 41) | Missing (n = 22) | Total (N = 254) |
|---|---|---|---|---|---|---|
| Profession (n [%]) | | | | | | |
| Acupuncturist | 23 (60.5%) | 30 (42.9%) | 21 (25.3%) | 23 (56.1%) | 12 (54.5%) | 109 (42.9%) |
| Acupuncturist and herbalist | 15 (39.5%) | 40 (57.1%) | 62 (74.7%) | 18 (43.9%) | 10 (45.5%) | 145 (57.1%) |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Medical doctor (n [%]) | | | | | | |
| Yes | 38 (100%) | 13 (18.6%) | 1 (1.2%) | 1 (2.4%) | 7 (31.8%) | 60 (23.6%) |
| No | 0 | 55 (78.5%) | 81 (97.6%) | 38 (92.7%) | 15 (68.2%) | 189 (74.4%) |
| Missing | 0 | 2 (2.9%) | 1 (1.2%) | 2 (4.9%) | 0 | 5 (2.0%) |
| Licensed acupuncturist/herbalist (n [%]) | | | | | | |
| Yes | 9 (23.7%) | 62 (88.6%) | 82 (98.8%) | 41 (100.0%) | 20 (90.9%) | 214 (84.2%) |
| No | 27 (71.0%) | 7 (10.0%) | 1 (1.2%) | 0 | 2 (9.1%) | 37 (14.6%) |
| Missing | 2 (5.3%) | 1 (1.4%) | 0 | 0 | 0 | 3 (1.2%) |
| Age (n [%]) | | | | | | |
| 18–25 years old | 0 | 0 | 0 | 0 | 0 | 0 |
| 26–35 years old | 7 (18.4%) | 0 | 7 (8.4%) | 3 (7.3%) | 1 (4.5%) | 18 (7.1%) |
| 36–45 years old | 10 (26.3%) | 6 (8.6%) | 14 (16.9%) | 9 (22.0%) | 4 (18.2%) | 43 (16.9%) |
| 46–55 years old | 13 (34.2%) | 32 (45.7%) | 29 (34.9%) | 10 (24.4%) | 8 (36.4%) | 92 (36.2%) |
| 56–65 years old | 6 (15.8%) | 23 (32.9%) | 19 (22.9%) | 16 (39.0%) | 7 (31.8%) | 71 (28.0%) |
| > 65 years old | 2 (5.3%) | 9 (12.8%) | 14 (16.9%) | 3 (7.3%) | 2 (9.1%) | 30 (11.8%) |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Highest completed education level (n [%]) | | | | | | |
| High school | 0 | 13 (18.6%) | 1 (1.2%) | 0 | 1 (4.5%) | 15 (5.9%) |
| College | 0 | 21 (30.0%) | 2 (2.4%) | 4 (9.8%) | 3 (13.6%) | 30 (11.8%) |
| University | 38 (100.0%) | 36 (51.4%) | 80 (96.4%) | 36 (87.8%) | 17 (77.3%) | 207 (81.5%) |
| Missing | 0 | 0 | 0 | 1 (2.4%) | 1 (4.5%) | 2 (0.8%) |
| Highest qualification in acupuncture (n [%]) | | | | | | |
| Short-term course (< 100 h) | 4 (10.5%) | 1 (1.4%) | 0 | 0 | 1 (4.5%) | 6 (2.4%) |
| Diploma or > 100 h | 32 (84.3%) | 55 (78.6%) | 1 (1.2%) | 28 (68.3%) | 8 (36.4%) | 124 (48.8%) |
| Masters' degree | 1 (2.6%) | 13 (18.6%) | 54 (65.1%) | 13 (31.7%) | 11 (50.0%) | 92 (36.2%) |
| PhD | 0 | 1 (1.4%) | 27 (32.5%) | 0 | 1 (4.5%) | 29 (11.4%) |
| Missing | 1 (2.6%) | 0 | 1 (1.2%) | 0 | 1 (4.5%) | 3 (1.2%) |
| Highest qualification in herbal medicine (n [%]) | | | | | | |
| Short-term course (< 100 h) | 3 (7.9%) | 1 (1.4%) | 0 | 0 | 1 (4.5%) | 5 (2.0%) |
| Diploma or > 100 h | 11 (28.9%) | 32 (45.7%) | 2 (2.4%) | 15 (36.6%) | 5 (22.7%) | 65 (25.6%) |
| Masters' degree | 1 (2.6%) | 7 (10.0%) | 46 (55.4%) | 3 (7.3%) | 3 (13.6%) | 60 (23.6%) |
| PhD | 0 | 0 | 13 (15.7%) | 0 | 1 (4.5%) | 14 (5.5%) |
| Missing | 23 (60.6%) | 30 (42.9%) | 22 (26.5%) | 23 (56.1%) | 12 (54.5%) | 110 (43.3%) |
| Focused training in oncology (n [%]) | | | | | | |
| Yes | 8 (21.1%) | 18 (25.7%) | 44 (53.0%) | 12 (29.3%) | 7 (31.8%) | 89 (35.0%) |
| No | 30 (78.9%) | 51 (72.9%) | 38 (45.8%) | 29 (70.7%) | 15 (68.2%) | 163 (64.2%) |
| Missing | 0 | 1 (1.4%) | 1 (1.2%) | 0 | 0 | 2 (0.8%) |
| Place of practice (n [%]) | | | | | | |
| Own solo clinic | 26 (68.4%) | 66 (94.3%) | 53 (63.9%) | 29 (70.7%) | 15 (68.2%) | 189 (74.4%) |
| Hospital | 10 (26.3%) | 1 (1.4%) | 13 (15.7%) | 1 (2.4%) | 1 (4.5%) | 26 (10.2%) |
| Multidisciplinary clinic | 2 (5.3%) | 3 (4.3%) | 17 (20.5%) | 10 (24.4%) | 6 (27.3%) | 38 (15.0%) |
| Missing | 0 | 0 | 0 | 1 (2.4%) | 0 | 1 (0.4%) |
| Clinic is focused on oncology (n [%]) | | | | | | |
| Yes | 8 (21.0%) | 4 (5.7%) | 16 (19.3%) | 4 (9.8%) | 0 | 32 (12.6%) |
| No | 28 (73.7%) | 62 (88.6%) | 67 (80.7%) | 36 (87.8%) | 21 (95.5%) | 214 (84.3%) |
| Missing | 2 (5.3%) | 4 (5.7%) | 0 | 1 (2.4%) | 1 (4.5%) | 8 (3.1%) |
| Main sources of information (n [%]) | | | | | | |
| Online literature databases (e.g., PubMed) | 6 (15.8%) | 8 (11.4%) | 41 (49.4%) | 13 (31.7%) | 4 (18.2%) | 72 (28.3%) |
| Conferences | 2 (5.3%) | 9 (12.9%) | 4 (4.8%) | 4 (9.8%) | 1 (4.5%) | 20 (7.9%) |
| Courses (CPD/CEU) | 16 (42.1%) | 26 (37.1%) | 21 (25.3%) | 16 (39.0%) | 5 (22.7%) | 84 (33.1%) |
| Print media (journals, books, etc.) | 4 (10.5%) | 16 (22.9%) | 2 (2.4%) | 3 (7.3%) | 2 (9.1%) | 27 (10.6%) |
| Webinars or seminars by experts | 6 (15.8%) | 8 (11.4%) | 7 (8.4%) | 3 (7.3%) | 6 (27.3%) | 30 (11.8%) |
| Missing | 4 (10.5%) | 3 (4.3%) | 8 (9.6%) | 2 (4.9%) | 4 (18.2%) | 21 (8.3%) |
| Most reliable source of information (n [%]) | | | | | | |
| Research papers | 11 (29.0%) | 14 (20.0%) | 37 (44.6%) | 16 (39.0%) | 5 (22.7%) | 83 (32.7%) |
| Experts | 16 (42.1%) | 37 (52.9%) | 23 (27.7%) | 12 (29.3%) | 6 (27.3%) | 94 (37.0%) |
| Books | 1 (2.6%) | 4 (5.7%) | 5 (6.0%) | 6 (14.6%) | 5 (22.7%) | 21 (8.3%) |
| Conferences | 4 (10.5%) | 10 (14.3%) | 10 (12.0%) | 5 (12.2%) | 2 (9.1%) | 31 (12.2%) |
| Missing | 6 (15.8%) | 5 (7.1%) | 8 (9.6%) | 2 (4.9%) | 4 (18.2%) | 25 (9.8%) |
| Years of practice (mean ± SD) | 13.3 ± 10.0 | 18.9 ± 9.5 | 14.8 ± 8.5 | 18.6 ± 10.5 | 19.8 ± 11.6 | 16.8 ± 9.9 |
| Number of patients per week (median [quartile]) | 30 (15, 55) | 21.5 (15, 30) | 30 (20, 43.8) | 30 (20, 40) | 30 (20, 40) | 25 (15, 40) |
| Years of treating cancer patients (mean ± SD) | 12.5 ± 9.6 | 12.3 ± 8.6 | 11.4 ± 8.1 | 14.5 ± 10.1 | 13.9 ± 10.8 | 12.5 ± 9.1 |
| Number of cancer patients per week (median [quartile]) | 2 (1, 10) | 2 (1, 3) | 3 (1, 7) | 2 (1, 3) | 1.5 (1, 3) | 2 (1, 4) |

Australasia: grouped numbers from Australia and New Zealand. CEU: continuing education unit; CPD: continuing professional development; PhD: doctor of philosophy; SD: standard deviation

**Table 2**
Information about clinical practice by country.

| Variable | Austria (*n* = 38) | Germany (*n* = 70) | United States of America (*n* = 83) | Australasia (*n* = 41) | Missing (*n* = 22) | Total (*n* = 254) |
|---|---|---|---|---|---|---|
| Type of cancer (*n* [%]) | | | | | | |
| Breast | 21 (55.3%) | 56 (80.0%) | 51 (61.4%) | 20 (48.8%) | 9 (40.9%) | 157 (61.8%) |
| Gastrointestinal | 7 (18.4%) | 1 (1.4%) | 5 (6.0%) | 2 (4.9%) | 3 (13.6%) | 18 (7.1%) |
| Lung | 2 (5.3%) | 3 (4.3%) | 3 (3.6%) | 6 (14.6%) | 0 | 14 (5.5%) |
| Pancreas/liver | 0 | 0 | 2 (2.4%) | 2 (4.9%) | 0 | 4 (1.6%) |
| Prostate | 2 (5.3%) | 3 (4.3%) | 1 (1.2%) | 3 (7.3%) | 1 (4.5%) | 10 (3.9%) |
| Other | 4 (10.5%) | 6 (8.6%) | 21 (25.3%) | 8 (19.5%) | 7 (31.8%) | 46 (18.1%) |
| Missing | 2 (5.3%) | 1 (1.4%) | 0 | 0 | 2 (9.1%) | 5 (2.0%) |
| Tumor stage (*n* [%]) | | | | | | |
| With metastases | 14 (36.8%) | 24 (34.3%) | 40 (48.2%) | 13 (31.7%) | 8 (36.4%) | 99 (39.0%) |
| Without metastases | 12 (31.6%) | 30 (42.9%) | 29 (34.9%) | 22 (53.7%) | 8 (36.4%) | 101 (39.8%) |
| Remission/cured | 10 (26.3%) | 14 (20.0%) | 11 (13.3%) | 6 (14.6%) | 4 (18.2%) | 45 (17.7%) |
| Missing | 2 (5.3%) | 2 (2.9%) | 3 (3.6%) | 0 | 2 (9.1%) | 9 (3.5%) |
| First time consultation (*n* [%]) | | | | | | |
| Shortly after cancer diagnosis | 8 (21.1%) | 18 (25.7%) | 10 (12.0%) | 7 (17.1%) | 7 (31.8%) | 50 (19.7%) |
| At the start of or during cancer treatment | 16 (42.1%) | 28 (40.0%) | 35 (42.2%) | 17 (41.5%) | 5 (22.7%) | 101 (39.8%) |
| After or in between cancer treatment | 8 (21.1%) | 22 (31.4%) | 31 (37.3%) | 16 (39.0%) | 7 (31.8%) | 84 (33.1%) |
| If they have been told that their cancer is incurable | 4 (10.5%) | 2 (2.9%) | 5 (6.0%) | 1 (2.4%) | 1 (4.5%) | 13 (5.1%) |
| Missing | 2 (5.3%) | 0 | 2 (2.4%) | 0 | 2 (9.1%) | 6 (2.4%) |
| Main reason for consultation (*n* [%]) | | | | | | |
| To cure their cancer | 4 (10.5%) | 4 (5.7%) | 2 (2.4%) | 5 (12.2%) | 2 (9.1%) | 17 (6.7%) |
| To strengthen their body during cancer treatment | 15 (39.5%) | 27 (38.6%) | 12 (14.5%) | 15 (36.6%) | 4 (18.2%) | 73 (28.7%) |
| To alleviate side effects of cancer treatment | 12 (31.6%) | 34 (48.6%) | 56 (67.5%) | 20 (48.8%) | 11 (50.0%) | 133 (52.4%) |
| To alleviate disease specific symptoms | 6 (15.8%) | 4 (5.7%) | 11 (13.3%) | 1 (2.4%) | 4 (18.2%) | 26 (10.2%) |
| Missing | 1 (2.6%) | 1 (1.4%) | 2 (2.4%) | 0 | 1 (4.5%) | 5 (2.0%) |
| Side effect of cancer specific treatment (*n* [%]) | | | | | | |
| Pain | 1 (2.6%) | 3 (4.3%) | 27 (32.5%) | 9 (22.0%) | 1 (4.5%) | 41 (16.1%) |
| Fatigue/drowsiness | 9 (23.7%) | 18 (25.7%) | 12 (14.5%) | 10 (24.4%) | 6 (27.3%) | 55 (21.7%) |
| Nausea/emesis | 0 | 3 (4.3%) | 8 (9.6%) | 0 | 3 (13.6%) | 14 (5.5%) |
| Anorexia (loss of appetite) | 0 | 0 | 0 | 0 | 0 | 0 |
| Breathlessness | 0 | 0 | 0 | 0 | 0 | 0 |
| Depression/anxiety | 1 (2.6%) | 8 (11.4%) | 9 (10.8%) | 0 | 1 (4.5%) | 19 (7.5%) |
| Sleep problems | 0 | 1 (1.4%) | 0 | 1 (2.4%) | 0 | 2 (0.8%) |
| Constipation | 1 (2.6%) | 0 | 0 | 0 | 0 | 1 (0.4%) |
| Missing | 26 (68.4%) | 37 (52.9%) | 27 (32.5%) | 21 (51.2%) | 11 (50.0%) | 122 (48.0%) |
| Acupuncture is most effective for (*n* [%]) | | | | | | |
| Pain | 18 (47.4%) | 14 (20.0%) | 32 (38.6%) | 18 (43.9%) | 5 (22.7%) | 87 (34.3%) |
| Fatigue/drowsiness | 6 (15.8%) | 9 (12.9%) | 11 (13.3%) | 8 (19.5%) | 7 (31.8%) | 41 (16.1%) |
| Nausea/emesis | 6 (15.8%) | 20 (28.6%) | 21 (25.3%) | 5 (12.2%) | 2 (9.1%) | 54 (21.3%) |
| Anorexia (loss of appetite) | 0 | 0 | 1 (1.2%) | 1 (2.4%) | 0 | 2 (0.8%) |
| Breathlessness | 0 | 1 (1.4%) | 0 | 0 | 0 | 1 (0.4%) |
| Depression/anxiety | 3 (7.9%) | 23 (32.9%) | 14 (16.9%) | 4 (9.8%) | 7 (31.8%) | 51 (20.1%) |
| Sleep problems | 2 (5.3%) | 1 (1.4%) | 1 (1.2%) | 2 (4.9%) | 0 | 6 (2.4%) |
| Constipation | 1 (2.6%) | 0 | 1 (1.2%) | 1 (2.4%) | 1 (4.5%) | 4 (1.6%) |
| Missing | 2 (5.3%) | 2 (2.9%) | 2 (2.4%) | 2 (4.9%) | 0 | 8 (3.1%) |
| Herbs are most effective for (*n* [%]) | | | | | | |
| Pain | 0 | 0 | 0 | 2 (4.9%) | 1 (4.5%) | 3 (1.2%) |
| Fatigue/drowsiness | 8 (21.1%) | 17 (24.3%) | 19 (22.9%) | 10 (24.4%) | 3 (13.6%) | 57 (22.4%) |
| Nausea/emesis | 1 (2.6%) | 4 (5.7%) | 6 (7.2%) | 3 (7.3%) | 3 (13.6%) | 17 (6.7%) |
| Anorexia (loss of appetite) | 0 | 2 (2.9%) | 3 (3.6%) | 0 | 0 | 5 (2.0%) |
| Breathlessness | 0 | 0 | 0 | 0 | 0 | 0 |
| Depression/anxiety | 2 (5.3%) | 7 (10.0%) | 6 (7.2%) | 0 | 2 (9.1%) | 17 (6.7%) |
| Sleep problems | 1 (2.6%) | 4 (5.7%) | 9 (10.8%) | 2 (4.9%) | 1 (4.5%) | 17 (6.7%) |
| Constipation | 1 (2.6%) | 4 (5.7%) | 13 (15.7%) | 0 | 0 | 18 (7.1%) |
| Missing | 25 (65.8%) | 32 (45.7%) | 27 (32.5%) | 24 (58.5%) | 12 (54.5%) | 120 (47.2%) |
| Combination with other CAM therapies (*n* [%]) | | | | | | |
| Yes | 21 (55.3%) | 47 (67.1%) | 55 (66.3%) | 27 (65.9%) | 14 (63.6%) | 164 (64.6%) |
| No | 17 (44.7%) | 23 (32.9%) | 27 (32.5%) | 14 (34.1%) | 8 (36.4%) | 89 (35.0%) |
| Missing | 0 | 0 | 1 (1.2%) | 0 | 0 | 1 (0.4%) |
| Contact with oncologist (*n* [%]) | | | | | | |
| Yes | 18 (47.4%) | 13 (18.6%) | 33 (39.8%) | 5 (12.2%) | 2 (9.1%) | 71 (28.0%) |
| No | 19 (50.0%) | 57 (81.4%) | 49 (59.0%) | 36 (87.8%) | 20 (90.9%) | 181 (71.3%) |
| Missing | 1 (2.6%) | 0 | 1 (1.2%) | 0 | 0 | 2 (0.8%) |
| Share information with oncologist (*n* [%]) | | | | | | |
| Yes | 13 (34.2%) | 5 (7.1%) | 24 (28.9%) | 2 (4.9%) | 2 (9.1%) | 46 (18.1%) |
| No | 5 (13.2%) | 8 (11.4%) | 9 (10.8%) | 3 (7.3%) | 0 | 25 (9.8%) |
| Missing | 20 (52.6%) | 57 (81.4%) | 50 (60.2%) | 36 (87.8%) | 20 (90.9%) | 183 (72.0%) |
| How is information shared (*n* [%]) | | | | | | |
| TCM terminology only | 1 (2.6%) | 0 | 0 | 0 | 0 | 1 (0.4%) |
| Biomedicine and scientific language only | 4 (10.5%) | 1 (1.4%) | 5 (6.0%) | 1 (2.4%) | 0 | 11 (4.3%) |
| A mixture of both | 8 (21.1%) | 4 (5.7%) | 19 (22.9%) | 1 (2.4%) | 1 (4.5%) | 33 (13.0%) |
| Missing | 25 (65.8%) | 65 (92.9%) | 59 (71.1%) | 39 (95.1%) | 21 (95.5%) | 209 (82.3%) |

CAM: complementary and alternative medicine; TCM: traditional Chinese medicine.

mainly before, during, or right after cancer-specific treatment, to alleviate treatment-related side effects. This highlights the focus of TCIM treatments being supportive care, which has been reported by patients to be the main reason to use TCIM [20].

Details about the most frequently treated symptoms align with the current recommendations of clinical guidelines [7–11,26]. In general, the most frequent symptoms for which patients consult a TCIM practitioner are fatigue/drowsiness, pain, and depression/anxiety, which are also the most commonly studied symptoms in the field of integrative oncology [1,6,27]. The respondents within our study rated pain, nausea/emesis, depression/anxiety, and fatigue/drowsiness to be treated most effectively using acupuncture, which also reflects the current scientific evidence and recommendations of leading oncological associations [7–11]. On the other hand, fatigue/drowsiness and constipation were the top-rated indications for herbal medicine, which is supported by a recent meta-analysis suggesting beneficial effects of Radix Astragali (Huangqi) and Atractylodis Macrocephalae (Baizhu) in cancer-related fatigue [28]. For constipation, randomized-controlled trials and meta-analysis investigating the effect of herbal medicine on constipation in cancer patients showed limited evidence for beneficial effects [29]. However, due to the vast possibilities of different and individualized herbal prescriptions, general recommendations for using herbal medicine in cancer care could not be established to date and remains a problem for efficacy and safety evaluation, especially in oncological care. Nevertheless, it is interesting to see that current TCIM practice reflects, to some extent, the current state of evidence.

TCIM practitioners typically take on cancer patients only after they have some years of experience practicing, given that the time of total practice differs significantly from the length of time treating cancer patients. In order to inform their clinical practice, most respondents used certified courses, and a small proportion received focused oncology training. Additionally, online databases of scientific literature are popular sources of information among this sample of TCIM practitioners. However, respondents rely more on experts than on research papers, which is contrary to the hierarchical grading of evidence broadly accepted in the scientific community [30]. Interestingly, we found country-specific differences concerning the reliability rating between Austria and Germany versus USA and Australasia, with the latter rating research papers as more reliable. This could be due to differences in educational backgrounds of TCIM practitioners between these countries. In Austria and Germany, very few TCIM practitioners with an acupuncture or herbal medicine diploma have advanced academic degrees in their field, while in USA and Australasia, it is required to hold a college degree or higher in acupuncture or herbology to become a licensed practitioner [13–16]. Practitioners in USA and Australasia may therefore be more familiar with and appreciative of TCIM research than practitioners from Austria and Germany. However, valuing experts' opinions more than research findings is not limited to TCIM practitioners treating cancer patients. A recent survey among Australasian TCIM practitioners who specialize in fertility support found similar results, showing that peer-reviewed research is the least utilized source of knowledge to inform and change their clinical practice. Furthermore, courses and conferences by experts also had a greater impact on how TCIM practitioners treat and support couples having fertility issues [31,32]. Compared to our sample, research papers are still more frequently used as sources of information by integrative oncology practitioners than practitioners involved in the support of fertility issues. This may be associated with the general higher awareness and concerns about interactions with oncological treatments, leading to a greater interest in the latest research within this field.

The majority of respondents practiced alone in their clinics. Additionally, in Austria and USA, a small proportion of TCIM practitioners were also employed in a hospital, suggesting a growing acceptance of TCIM therapies in an in-hospital setting and the public healthcare system in general. In Austria, this is certainly related to the high number of medical doctors practicing TCIM and incorporating additional therapies such as acupuncture into their daily practice. Austrian governmental regulations do not allow healthcare disciplines other than medical doctors to perform acupuncture and herbal medicine [16]. In USA, on the other hand, various institutions have promoted the integration of acupuncture into the public healthcare system in recent years [33]. The growing evidence of acupuncture's clinical effectiveness and the ongoing opioid crisis led to its recommendation in clinical guidelines from leading medical associations and also to its coverage under insurance plans from Medicare and the Veterans Health Administration. In turn, more TCIM practitioners were hired by various healthcare facilities to offer acupuncture in particular for the treatment of pain-related conditions [33]. However, being in contact with oncologists is still rare for the respondents (28.0%), which limits interdisciplinary information exchange and may therefore be a source of risk for adverse events or interactions with cancer specific treatments. Further integration of TCIM practitioners into public healthcare facilities may help to improve interdisciplinary communication, creating a multidisciplinary environment for safe integrative cancer care provision [33].

Qualitative analysis of the reasons provided for not treating cancer patients complements our findings in general. Apart from having no referrals or focusing on other health conditions, lacking clinical experience and concerns about interactions were the most common reasons for respondents choosing not to treat cancer patients in their clinics. The results suggest an increasing specialization of TCIM practitioners with a distinct differentiation of their own capabilities. Most respondents also stated a need for further training before starting to treat cancer patients, which raises the question of whether educational or licensing programs should be established to develop a subdiscipline of integrative TCIM oncologists. A structured program that includes biological and clinical basics of oncological diseases, current evidence-based recommendations for TCIM treatments, and skills in interpreting new research findings could train TCIM practitioners to provide safe and effective support to cancer patients.

There are certain limitations to this study that must be acknowledged. First, the overall response rate to the survey was low, which is common in surveys using a convenience-sampling design and may be due to several factors, including low interest in actively participating in research and not being involved in the field of oncology, hence no interest in filling out the survey [34]. However, the results showed a relatively high response rate of practitioners who are not treating cancer patients and still wanted to provide reasons behind their choice. Second, we chose the participating countries based on our connections to the professional organizations. Hence, the results may not be fully representative of the international practice in Western countries. Additionally, the sample size per country is low, which should be accounted for when interpreting the results of country specific analyses. Thirdly, the survey did not include details about the acupuncture or herbal therapies provided to cancer patients, such as the most used acupuncture points, herbal prescription patterns and their rationale, which should be the focus of future studies.

## 5. Conclusion

These results provide a comprehensive overview of the current landscape of integrative oncology practice at an international level. According to our data, practitioners are aware of the challenges faced in treating cancer patients, including interactions with conventional therapies, which they also reported to be a reason for deciding not to see cancer patients in their clinics. TCIM practitioners start treating cancer patients after gaining general practice experience, and use continuing professional education and scientific papers to further inform their practice. When providing supportive and palliative care in oncology, TCIM practitioners adhere to current recommendations by leading oncological societies. Positive trends towards a better integration of TCIM in cancer care are noticeable in USA and Australasia, showing high proportions of TCIM practitioners working at a hospital and holding academic level degrees. However, there is still a substantial need for further education in terms of cancer care and research literacy. As evidenced by country-specific differences in valuing scientific findings of TCIM, this accounts especially for Germany and Austria.

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## Authors' contributions

MH and SG designed the survey, contacted the participating professional organizations, analyzed the data and wrote the manuscript. MH and MP performed the statistical analysis. GH, SB and MA supported in the interpretation of the results and reviewed the manuscript. All authors read and approved the final manuscript.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.joim.2023.12.002.

## References

[1] Zia FZ, Olaku O, Bao T, Berger A, Deng G, Yin Fan A, et al. The National Cancer Institute's conference on acupuncture for symptom management in oncology: state of the science, evidence, and research gaps. J Natl Cancer Inst Monogr 2017;2017(52):lgx005.

[2] World Health Organization. WHO global report on traditional and complementary medicine; 2019 (2019-06-04) [2023-03-03]. https://www.who.int/publications/i/item/978924151536.

[3] World Health Organization. Traditional, complementary and integrative medicine; 2023 [2023-09-23]. https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab_1.

[4] Keene MR, Heslop IM, Sabesan SS, Glass BD. Complementary and alternative medicine use in cancer: a systematic review. Complement Ther Clin Pract 2019;35:33–47.

[5] Svenkerud S, MacPherson H. The impact of STRICTA and CONSORT on reporting of randomized control trials of acupuncture: a systematic methodological evaluation. Acupunct Med 2018;36(6):349–57.

[6] Guo J, Pei L, Chen L, Chen H, Gu D, Xin C, et al. Research trends of acupuncture therapy on cancer over the past two decades: a bibliometric analysis. Integr Cancer Ther 2020;19:1534735420959442.

[7] Lyman GH, Greenlee H, Bohlke K, Bao T, DeMichele AM, Deng GE, et al. Integrative therapies during and after breast cancer treatment: ASCO endorsement of the SIO clinical practice guideline. J Clin Oncol 2018;36(25):2647–55.

[8] Mao JJ, Ismaila N, Bao T, Barton D, Ben-Arye E, Garland EL, et al. Integrative medicine for pain management in oncology: Society for Integrative Oncology-ASCO guideline. J Clin Oncol 2022;40(34):3998–4024.

[9] National Comprehensive Cancer Network. Adult cancer pain (version 2); 2022 [2023-03-03]. https://www.nccn.org/guidelines/guidelines-detail?category=3&id=1413.

[10] National Comprehensive Cancer Network. Cancer-related fatigue (version 2); 2023 [2023-03-03]. https://www.nccn.org/professionals/physician_gls/pdf/fatigue.pdf.

[11] National Comprehensive Cancer Network. Antiemesis (version 1); 2023 [2023-03-03]. https://www.nccn.org/guidelines/guidelines-detail?category=3&id=1415.

[12] He Y, Guo X, May BH, Zhang AL, Liu Y, Lu C, et al. Clinical evidence for association of acupuncture and acupressure with improved cancer pain: a systematic review and meta-analysis. JAMA Oncol 2020;6(2):271–8.

[13] Fan AY, Stumpf SH, Faggert Alemi S, Matecki A. Distribution of licensed acupuncturists and educational institutions in the United States at the start of 2018. Complement Ther Med 2018;41:295–301.

[14] Ijaz N, Boon H. Evaluating the international standards gap for the use of acupuncture needles by physiotherapists and chiropractors: a policy analysis. PLoS One 2019;14(12):e0226601.

[15] Lin K, Tung C. The regulation of the practice of acupuncture by physicians in the United States. Med Acupunct 2017;29(3):121–7.

[16] Das Rechtsinformationssystem des Bundes. Austrian laws; 2023 [2023-03-03]. https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011138 [German].

[17] Molassiotis A, Fernandez-Ortega P, Pud D, Ozden G, Scott JA, Panteli V, et al. Use of complementary and alternative medicine in cancer patients: a European survey. Ann Oncol 2005;16(4):655–63.

[18] Mao JJ, Palmer CS, Healy KE, Desai K, Amsterdam J. Complementary and alternative medicine use among cancer survivors: a population-based study. J Cancer Surviv 2011;5(1):8–17.

[19] Anderson JG, Taylor AG. Use of complementary therapies for cancer symptom management: results of the 2007 National Health Interview Survey. J Altern Complement Med 2012;18(3):235–41.

[20] Rossi E, Vita A, Baccetti S, Di Stefano M, Voller F, Zanobini A. Complementary and alternative medicine for cancer patients: results of the EPAAC survey on integrative oncology centres in Europe. Support Care Cancer 2015;23(6):1795–806.

[21] Verhoef MJ, Mulkins A, Carlson LE, Hilsden RJ, Kania A. Assessing the role of evidence in patients' evaluation of complementary therapies: a quality study. Integr Cancer Ther 2007;6(4):345–53.

[22] Weeks L, Balneaves LG, Paterson C, Verhoef M. Decision-making about complementary and alternative medicine by cancer patients: integrative literature review. Open Med 2014;8(2):e54–66.

[23] Truant TL, Porcino AJ, Ross BC, Wong ME, Hilario CT. Complementary and alternative medicine (CAM) use in advanced cancer: a systematic review. J Support Oncol 2013;11(3):105–13.

[24] Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 2009;42(2):377–81.

[25] Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: building an international community of software platform partners. J Biomed Inform 2019;95:103208.

[26] Bower JE, Bak K, Berger A, Breitbart W, Escalante CP, Ganz PA, et al. Screening, assessment, and management of fatigue in adult survivors of cancer: an American Society of Clinical Oncology clinical practice guideline adaptation. J Clin Oncol 2014;32(17):1840–50.

[27] Wang H, Yang G, Wang S, Zheng X, Zhang W, Li Y. The most commonly treated acupuncture indications in the United States: a cross-sectional study. Am J Chin Med 2018:1–33.

[28] Zhang C, Guo W, Yao X, Xia J, Zhang Z, Li J, et al. Database mining and animal experiment-based validation of the efficacy and mechanism of Radix Astragali (Huangqi) and Rhizoma Atractylodis Macrocephalae (Baizhu) as core drugs of traditional Chinese medicine in cancer-related fatigue. J Ethnopharmacol 2022;285:114892.

[29] Chung VCH, Wu X, Lu P, Hui EP, Zhang Y, Zhang AL, et al. Chinese herbal medicine for symptom management in cancer palliative care: systematic review and meta-analysis. Medicine (Baltimore) 2016;95(7):e2793.

[30] Dai Z, Liao X, Wieland LS, Hu J, Wang Y, Kim TH, et al. Cochrane systematic reviews on traditional Chinese medicine: what matters—the quantity or quality of evidence? Phytomedicine 2022;98:153921.

[31] Armour M, Betts D, Roberts K, Armour S, Smith CA. The role of research in guiding treatment for women's health: a qualitative study of traditional

Chinese medicine acupuncturists. Int J Environ Res Public Health 2021;18 (2):834.

[32] Graca S, Betts D, Roberts K, Smith CA, Armour M. The changing clinical landscape in acupuncture for women's health: a cross-sectional online survey in New Zealand and Australia. BMC Complement Med Ther 2022;22 (1):94.

[33] Miller DW, Roseen EJ, Stone JAM, Gardiner P, Olson J, Rosen S, et al. Incorporating acupuncture into American healthcare: initiating a discussion on implementation science, the status of the field, and stakeholder considerations. Glob Adv Health Med 2021;10:21649561211042574.

[34] Stratton SJ. Population research: convenience sampling strategies. Prehosp Disaster Med 2021;36(4):373–4.