Patient Preference and Adherence

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ORIGINAL RESEARCH

Who is Seeking Traditional Chinese Medicine (TCM) for Cancer? Insights from a Large Cohort in a Rehabilitation Clinic

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Purpose: Traditional Chinese Medicine (TCM) is widely used in cancer care, yet its utilization features are not well understood. By providing a comprehensive overview of the demographic and clinical characteristics, symptom burden, HRQoL, and TCM constitution of cancer patients seeking TCM treatment, we aim to offer insights into the integration of TCM into cancer care.

Patients and Methods: The questionnaire collected data on demographic and clinical characteristics, the MD Anderson Symptom Inventory for Traditional Chinese Medicine (MDASI-TCM), the EuroQol-5Dimensions-5Levels (EQ-5D-5L), and the simplified version of the Constitution in Chinese Medicine Questionnaire (CCMQ). A descriptive analysis was conducted to profile the patients' status and expectations of TCM. Chi-square or Fisher exact tests were employed to compare the distribution of TCM constitutional types across different cancer diagnoses.

Results: Among 3047 eligible patients, 2796 (median age 55) completed the questionnaire and were subsequently included in the analysis. The cohort was predominantly female (56.5%), with lung cancer being the most common primary diagnosis (25.2%). Furthermore, 86.7% of the patients presented with a good performance status (ECOG-PS $\leq$ 1). The main reasons patients sought TCM treatment were to alleviate cancer-related symptoms (59.4%) and enhance immune function (55.4%). The most prevalent symptoms (scored 1–10 on a 0–10 scale) were fatigue (81.1%), followed by disturbed sleep (81.0%), and dry mouth (78.2%). The mean and median EQ-5D-5L utility scores were 0.81 and 0.89, respectively. About 83.4% of cancer patients exhibited a deviation in TCM constitution, with Yang-deficiency being particularly common among them.

Conclusion: This study highlights the symptom burden, HRQoL, TCM constitution, and characteristics of patients who pursue TCM treatment. It advances our understanding of TCM's role in cancer rehabilitation by shedding light on target population potential needs of care. The findings provide a foundation for developing evidence-based strategies to enhance TCM application in clinical settings, optimize resource allocation, and improve rehabilitation outcomes for cancer patients.

Keywords: traditional Chinese medicine, patient-reported outcomes, symptom burden, health-related quality of life, TCM constitution, cancer rehabilitation

Introduction

The 2022 Global Cancer statistics indicate approximately 20 million new cancer cases and nearly 10 million cancer-related deaths, the top three types were lung cancer (12.4%), female breast cancer (11.5%), and colorectal cancer (9.6%).[1] China leading globally in both the incidence and mortality rates of cancer. Cancer treatments have long focused

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on surgery, radiation therapy, chemotherapy and targeted therapy, etc.[2] Despite achieving radical or temporary tumor control, cancer survivors continue to experience a substantial symptom burden resulting from both the disease itself and treatment-induced adverse effects.[3,4] Symptoms can be acute, manifesting during treatment, but may also involve long-term and late effects, with approximately one-third of cancer survivors receiving treatment reporting three or more moderate-to-severe symptoms.[5] The symptom burden is particularly pronounced in patients with advanced or metastatic cancer. Although effective symptom management through symptom monitoring can enhance health-related quality of life (HRQoL), mitigate treatment-related toxicities, and potentially improve overall survival,[6,7] many patients continue to report undertreatment or non-treatment of symptoms with conventional cancer therapies.[8] An increasing number of cancer patients are turning to complementary and alternative medicine (CAM) as part of supportive care for symptom management.[9]

CAM includes traditional herbal medicine, acupuncture, massage, and music therapy, among others, which originated in countries such as China, Rome, and India.[10] Compared to other CAMs, Traditional Chinese Medicine (TCM) is deeply rooted in Chinese culture and is an important part of the traditional culture of the Chinese nation.[11] Over thousands of years, TCM has developed a distinct theoretical framework, diagnostic methods, and therapeutic approaches in Asian countries, and especially China.[12] Therefore, cancer patients are more likely to accept TCM for symptom management, making it mainstream. In China, 53% to 83% of cancer patients use TCM during cancer treatments,[13–15] and 94.6% of cancer patients express a willingness to incorporate TCM into their treatment regimen.[16] Furthermore, many cancer hospitals have integrated TCM care into their service offerings, which improved accessibility to TCM for cancer patients. A substantial body of research has demonstrated that TCM not only alleviates clinical symptoms in cancer patients and boosts the immune system but also mitigates the adverse effects and complications associated with radiotherapy, chemotherapy, or targeted therapy.[12,17–19] The effects are mainly attributed to the active ingredients in TCM, such as ginsenosides in Panax ginseng, which have been found to have anti-inflammatory, antioxidant, and anticancer actions,[20] and saponins and flavonoids in Astragali radix contribute to anticancer and immunomodulatory actions.[21] Although some Chinese medicines contain toxic ingredients, their use, dosage, and treatment cycle are carefully controlled to minimize side effects and toxicity.[22] Notably, acupuncture has been shown to be particularly effective in managing common cancer-related symptoms such as pain, nausea and vomiting, fatigue, dry mouth, peripheral neuropathy, and sleep disturbances.[23–25] Other benefits of TCM include reducing the likelihood of tumor recurrence and metastasis, with a low incidence of adverse events.[18]

The concept of cancer rehabilitation within TCM has been introduced in recent years, garnering significant attention for its perceived effectiveness in the rehabilitation field.[16] However, as an emerging field, securing effective resource allocation and determining appropriate TCM service for patients necessitate careful consideration and systematic planning. Although the prevalence, patterns, and barriers to integrating CAM into cancer patient care have been well-documented,[26–29] few studies have investigated the critical factors in health system management, such as the demographic and disease characteristics, symptom burden, HRQoL and TCM constitution of patients seeking TCM services in cancer hospital settings. Even if there are articles about it, they often focus solely on specific treatments like acupuncture or specific cancer types such as lung cancer.[30,31] To bridge this knowledge gap, we analyzed the baseline data of a prospective cohort, which was continuously recruiting patients from the TCM rehabilitation clinic in a cancer hospital. This study sought to identify the demographic and clinical characteristics, as well as the motivations of cancer patients seeking TCM treatment, to provide a comprehensive understanding of their symptom burden, HRQoL, and TCM constitution.

Materials and Methods

Setting and Participants

We extracted baseline data from an ongoing prospective cohort study for analysis. Participants were cancer patients who sought TCM treatment at the TCM Rehabilitation Department of Sichuan Cancer Hospital (the largest cancer hospital in Southwest China) from September 2021 to July 2024. Eligible patients were aged over 18 years and had a definite current or past diagnosis of cancer. Patients with cognitive impairments, communication difficulties, refusal, or physical weakness preventing them from completing the questionnaire were excluded. Participants were instructed to complete the survey independently. In cases of difficulty completing the scales, investigators or designated proxies assisted

participants by reading each item aloud and recording their responses. Ethics approval for the study was granted by the Ethics Committee for Medical Research and New Medical Technology of Sichuan Cancer Hospital (Approval Number: SCCHEC-02-2021-048 and KY-2021-004-03). All participants provided informed consent. The study complies with the Declaration of Helsinki.

Treatment Procedure

The content of treatment mainly included two modules: Chinese herbal medicine (CHM) therapies and acupuncture intervention. CHM therapies adhered to TCM syndrome differentiation principles, emphasizing health strengthening (Fu-Zheng) and pathogen elimination (Qu-Xie). TCM physicians prescribe a combination of different herbs tailored to each patient diagnosed with individualized TCM syndromes based on symptoms and observations of tongue and pulse. For the acupuncture intervention, acupoints were tailored to the presentation of the individual and selected based on the theory of TCM, patient-reported symptoms, and the expertise of TCM-trained acupuncturists. Needles were manually manipulated to achieve the "De Qi" sensation, and retained for 30 minutes.[32] Patients were monitored for potential side effects during each visit. All participating TCM physicians and acupuncturists were certified professionals, with a minimum of 10 years of experience in oncology and extensive training in the study protocol.

Study Measures

Patients received a paper-based questionnaire during their visits. Data on general demographic and disease-related characteristics were collected. Demographic data included sex, age, body mass index (BMI), education level, comorbidities, etc. The latter included cancer diagnosis, Eastern Cooperative Oncology Group score (ECOG-PS), and historical treatments received.

Patients were invited to complete the MD Anderson Symptom Inventory for Traditional Chinese Medicine (MDASI-TCM), the EuroQol-5Dimensions-5Levels (EQ-5D-5L), and the Constitution in Chinese Medicine Questionnaire (CCMQ) either by the receptionist or the clinician before their treatment. Patients with TCM consultation records but no MDASI-TCM or CCMQ data would be excluded.

Since symptoms are a primary reason for patients with cancer to seek TCM,[29] we selected MDASI-TCM as the patient-reported outcome measure (PROM) to assess both disease- and treatment-related symptoms, as well as those commonly addressed in TCM practice. MDASI-TCM is a widely utilized PROs instrument designed to assess symptoms experienced by cancer patients who opt for TCM. The Chinese version of the MDASI-TCM has been psychometrically and clinically validated.[33] It comprises 13 core symptoms, 7 symptoms specific to TCM practices, and 6 interference items. Each item is rated on a 0–10 scale, where 0 denotes "Not Present" and 10 denotes "As Bad As You Can Imagine".[34,35] The total interference score is a composite endpoint of six items, assessing the extent to which symptoms interfere with affective (REM: social relationships, enjoyment of life, mood) and physical (WAW: walking, general activity, work) components. Patient-reported scores were classified as none (0), mild (1–3), moderate (4–6), or severe (7–10) symptom burden/interference.[36]

EQ-5D-5L is a multidimensional measure of HRQoL that includes five domains to describe patients' health: (1) mobility; (2) self-care; (3) usual activities; (4) pain/discomfort; and (5) anxiety/depression, with a scale ranging from 0 (no difficulty) to 4 (extreme difficulty). The Chinese version of the EQ-5D-5L has been validated.[37] Health utility values are derived from the Chinese EQ-5D-5L Value Set.[38] Another component of the EQ-5D-5L, the EQ Visual Analogue Scale (EQ-VAS), enables patients to assess their current health status on a scale from 0 (the worst health state they can imagine) to 100 (the best health state they can imagine).

Constitution is formed under the influence of innate endowment inheritance and acquired environment. The constitution of different individuals has certain differences. According to the theory of TCM constitution, individuals can be categorized into nine distinct constitutional types: one balanced constitution (Gentleness) and eight imbalanced constitutions (Yang-deficiency, Yin-deficiency, Phlegm-dampness, Qi-deficiency, Damp-heat, Blood-stasis, Depressive, and Inherited special constitution). The simplified version of the CCMQ was utilized to assess and classify the participants' TCM constitutional types.[39] Each type of constitution corresponds to a subscale, measuring items in five-level ratings from "none" to "always", with the raw scores and converted scores calculated from one formula. Specifically, the

conversion score is defined as [(original score − number of entries) / (number of entries×4)]×100. A balanced constitution is identified if the subscale score for this constitution is greater than or equal to 60, while all other eight subscales score less than 40. If the score of any other unbalanced constitution reaches 40, the constitution is determined as the type the individual belongs to.

Statistical Analysis

Patients who provided complete demographic and clinical information and achieved completion rate were included in the analysis. The completion rate was calculated, with the MDASI-TCM completion defined as successfully answering 80% or more of the questionnaire items (21 out of 26). The top three imbalanced TCM Constitutional types were those with the highest rate in each cancer type. Descriptive statistics were utilized to summarize the demographic and clinical characteristics, PROs, and TCM constitutional types. Continuous variables were expressed as either the mean and standard deviation (SD) or the median with interquartile range (IQR), whereas categorical variables were presented as absolute frequencies and percentages. The differences in TCM constitutional types among various cancer diagnoses were evaluated using the χ^2 test, and the *P* value calculation that did not meet the χ^2 test conditions used Fisher's exact test. Differences were deemed statistically significant if the two-tailed *P*-values were <0.05. All data analyses were conducted using SAS V.9.4 (SAS Institute).

Results

Baseline Demographic and Disease-Related Characteristics

A total of 3047 patients sought TCM treatment from September 2021 to July 2024. Demographic and clinical data at baseline were missing for 167 patients, and an additional 84 patients were excluded for not achieving an 80% completion rate in questionnaires. Consequently, 2796 patients (91.8%) consented to PROs collection and met the inclusion criteria for study analysis. The demographic and clinical characteristics of these patients are detailed in Table 1. Cancer patients attending the TCM rehabilitation clinic were predominantly female, with a median (IQR) age of 55 (49–64) years. 396 patients (14.2%) were aged 70 years or older (median, 74 years), 20.6% were between 60 and 69 years (median, 65 years), 38.8% were between 50 and 59 years (median, 55 years), and 26.4% were younger than 50 years (median, 44 years). Among the patients included in the study, 91.0% were married. The majority (72.6%) reported having received at

Table 1 Demographic and Disease-Related Characteristics (n=2796)

Patient Characteristics	n	%
Age (years), [median (IQR)]	55(49–64)	
Age (years)		
<50	739	(26.4)
50–59	1084	(38.8)
60–69	577	(20.6)
≥70	396	(14.2)
BMI (kg/m^2), [median(IQR)]	22.6(20.4–24.8)	
BMI (kg/m^2)		
Underweight (<18.5)	267	(9.9)
Normal weight (18.5–24)	1550	(57.4)
Overweight (24–28)	693	(25.7)
Obesity (≥28)	191	(7.1)
Sex		
Male	1216	(43.5)
Female	1580	(56.5)
Race		
Han	2696	(97.2)
Minority	78	(2.8)

(*Continued*)

Table 1 (Continued).

Patient Characteristics	n	%
Marital status		
Married	2529	(91.0)
Others	250	(9.0)
Education level		
Primary school or below	754	(27.4)
Middle and high schools	1345	(48.9)
Junior college	364	(13.2)
Bachelor's degree or above	287	(10.4)
Employment status		
Unemployed	463	(16.9)
Employed	449	(16.4)
Peasantry	759	(27.7)
Retiree	764	(27.9)
Others	306	(11.2)
Type of insurance		
Employee's medical insurance	1234	(45.4)
Residents' medical insurance	439	(16.2)
Rural medical insurance	970	(35.7)
Others	75	(2.8)
Smoking status		
Never	1838	(66.9)
Current	253	(9.2)
Former	655	(23.9)
Drinking history		
No	1780	(65.4)
Yes	942	(34.6)
Hypertension		
No	2241	(83.0)
Yes	458	(17.0)
Diabetes		
No	2447	(91.5)
Yes	228	(8.5)
Coronary disease		
No	2552	(96.8)
Yes	85	(3.2)
Family history of cancer		
No	2080	(75.5)
Yes	674	(24.5)
Prior cancer treatments received		
No prior treatment	156	(6.3)
Surgery only	488	(19.8)
Chemotherapy only	233	(9.4)
Radiotherapy only	59	(2.4)
Surgery and chemotherapy, or surgery and radiotherapy, or chemotherapy and radiotherapy	1048	(42.5)
Surgery and radiotherapy and chemotherapy	482	(19.5)
ECOG-PS		
0	465	(18.0)
1	1777	(68.7)
2	228	(8.8)
3–4	117	(4.5)

(*Continued*)

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Table 1 (Continued).

Patient Characteristics	n	%
Cancer primary site		
Lung	705	(25.2)
Gynecological	378	(13.5)
Breast	364	(13.0)
Nasopharynx	241	(8.6)
Colorectal	231	(8.3)
Esophagus	205	(7.3)
Hepatobiliary pancreas	143	(5.1)
Gastric	102	(3.6)
Thyroid	94	(3.4)
Others	333	(11.9)
The reasons for the visit		
Symptom control	1661	(59.4)
Functional recovery	1337	(47.8)
Immune regulation	1550	(55.4)
Tumor control	1242	(44.4)
Therapy-induced toxicities reduction	596	(21.3)
Other reasons	76	(2.7)

Abbreviations: IQR, interquartile range; BMI, body mass index; ECOG PS, Eastern Cooperative Oncology Group performance status.

least a middle or high school education and 16.4% of patients were employed full-time. Lung cancer was the most prevalent diagnosis (25.2%), followed by gynecological (13.5%), breast (13.0%), nasopharyngeal (8.6%), and colorectal (8.3%). 86.7% of the patients presented with good performance status (ECOG-PS≤1). The primary purposes for patients seeking TCM treatment were to alleviate cancer-related symptoms (59.4%) and boost the immune system (55.4%). Most cancer patients had completed conventional anticancer therapies before receiving TCM treatment, and 19.8% of the patients had only undergone surgery (indicating the early stage of cancer).

Patient-Reported Outcomes (MDASI-TCM and EQ-5D-5L)

Among all patients, fatigue was the most frequently reported symptom (81.1%), followed by disturbed sleep (81.0%), dry mouth (78.2%), and memory difficulty (76.4%). Vomiting had the lowest incidence of reported symptoms (40.6%). Among patients with moderate-to-severe symptoms (scores of ≥4 on the MDASI-TCM's 0–10 scale), disturbed sleep (50.3%) was the most prevalent, followed by fatigue (43.0%), dry mouth (41.2%), and feeling cold (38.6%). The median (IQR) number of moderate-to-severe symptoms reported was 5 (2–10). The most elevated self-reported symptom scores were observed for disturbed sleep (3.87±3.01), fatigue (3.38±2.68), and dry mouth (3.30±2.80). Feeling cold (3.06±2.80) and bitter taste (2.65±2.69) were the most elevated TCM-specific symptom scores. The mean patient-reported composite interference scores in the physical function subscale (WAW) and affective function subscale (REM) were 2.03±2.28 and 1.95±2.14 respectively, indicating broad symptom interference in cancer patients seeking TCM treatment (Table 2).

The distribution of patients reporting difficulties in each dimension of the EQ-5D-5L is presented in Table 3 and Figure 1. The pain/discomfort dimension was the most commonly reported issue, affecting 69.1% of patients, followed by anxiety/depression (56.6%), mobility (34.3%), usual activities (28.1%), and self-care (15.1%). In total, 478 patients (17.2%) reported no issues across any of the five dimensions. The mean and median EQ-5D-5L index values for all cancer patients, applying the Chinese preference weights, were 0.81 and 0.89 respectively. The index values ranged from −0.391 to 1. Only 49 respondents (1.8%) had negative utilities, while 69.7% of the total sample reported utility values ≥0.8. The mean and median EQ-VAS scores were 69.42 and 70.0, respectively. Overall, self-reported EQ-VAS scores ranged from 10 to 100, with the three most frequently reported values being 80 (15.2%), 70 (11.9%), and 60 (11.7%).

Table 2 Mean MDASI-TCM Scores: Symptom Burden and Interference Severity

Items	N	Mean Score	None	Mild	Moderate	Severe
		mean±SD	n(%)	n(%)	n(%)	n(%)
Core items						
Pain	2790	2.33±2.67	1117(40.0)	918(32.9)	487(17.5)	268(9.6)
Fatigue (tiredness)	2790	3.38±2.68	527(18.9)	1064(38.1)	791(28.4)	408(14.6)
Nausea	2774	1.70±2.41	1455(52.5)	779(28.1)	369(13.3)	170(6.1)
Disturbed sleep	2785	3.87±3.01	530(19.0)	853(30.6)	775(27.8)	627(22.5)
Distressed (upset)	2784	2.81±2.72	847(30.4)	951(34.2)	668(24.0)	317(11.4)
Shortness of breath	2790	2.62±2.64	894(32.0)	1020(36.6)	579(20.8)	297(10.6)
Problems remembering things	2788	2.90±2.48	652(23.4)	1124(40.3)	745(26.7)	267(9.6)
Lack of appetite	2790	3.04±2.96	818(29.3)	953(34.2)	580(20.8)	439(15.7)
Drowsy (sleepy)	2782	2.63±2.66	901(32.4)	1026(36.9)	559(20.1)	296(10.6)
Dry mouth	2792	3.30±2.80	609(21.8)	1032(37.0)	718(25.7)	433(15.5)
Sadness	2792	2.29±2.59	1102(39.5)	911(32.6)	553(19.8)	226(8.1)
Vomiting	2786	1.43±2.32	1656(59.4)	681(24.4)	295(10.6)	154(5.5)
Numbness or tingling	2785	2.29±2.64	1139(40.9)	876(31.5)	515(18.5)	255(9.2)
TCM-specific items						
Sweating	2766	2.60±2.67	909(32.9)	990(35.8)	578(20.9)	289(10.4)
Feeling cold	2772	3.06±2.80	762(27.5)	940(33.9)	684(24.7)	386(13.9)
Constipation	2790	2.33±2.81	1167(41.8)	865(31.0)	435(15.6)	323(11.6)
Bitter taste	2791	2.65±2.69	908(32.5)	1003(35.9)	578(20.7)	302(10.8)
Coughing	2791	2.25±2.55	1051(37.7)	1036(37.1)	462(16.6)	242(8.7)
Palpitation (racing heartbeat)	2784	2.05±2.38	1130(40.6)	1008(36.2)	462(16.6)	184(6.6)
Heat in palms or soles	2783	1.58±2.18	1393(50.1)	911(32.7)	364(13.1)	115(4.1)
Interfered items						
General activity	2796	1.94±2.42	1278(45.7)	917(32.8)	431(15.4)	170(6.1)
Mood	2781	2.41±2.53	948(34.1)	1040(37.4)	564(20.3)	229(8.2)
Work	2772	2.13±2.65	1176(42.4)	939(33.9)	420(15.2)	237(8.5)
Relations with other people	2771	1.55±2.23	1474(53.2)	825(29.8)	356(12.8)	116(4.2)
Walking	2791	2.06±2.63	1296(46.4)	806(28.9)	457(16.4)	232(8.3)
Enjoyment of life	2787	1.90±2.50	1354(48.6)	811(29.1)	432(15.5)	190(6.8)
Total Interference						
Physical interference subscale (WAW)			2.03±2.28			
Affective interference subscale (REM)			1.95±2.14			
Number of moderate-to-severe symptoms reported, [median (IQR)]			5(2–10)			

Abbreviations: WAW, walking, activity, work; REM, relations, enjoyment of life, mood.

Table 3 Frequencies of Item Response in Each EQ-5D-5L Dimension, EQ-5D-5L Index Value and EQ-VAS Scores Reported by Participants

Dimensions	N	No Problem	Slight Problem	Moderate Problem	Severe Problem	Extreme Problem
Mobility, n (%)	2781	1826(65.7)	616(22.2)	213(7.7)	83(3.0)	43(1.5)
Self-care, n (%)	2775	2355(84.9)	266(9.6)	71(2.6)	39(1.4)	44(1.6)
Usual activities, n (%)	2780	1998(71.9)	535(19.2)	128(4.6)	63(2.3)	56(2.0)
Pain/discomfort, n (%)	2781	859(30.9)	1308(47.0)	401(14.4)	152(5.5)	61(2.2)
Anxiety/depression, n (%)	2775	1203(43.4)	1146(41.3)	317(11.4)	66(2.4)	43(1.5)
			Mean (SD)	Median (IQR)		
EQ-VAS			69.42(18.51)	70.0(60.0–81.0)		
EQ-5D-5L index value			0.81(0.23)	0.89(0.76–0.94)		

Abbreviations: EQ-5D-5L, EuroQol-5Dimensions-5Levels; VAS, visual analog scale; SD, standard deviation; IQR, interquartile range.

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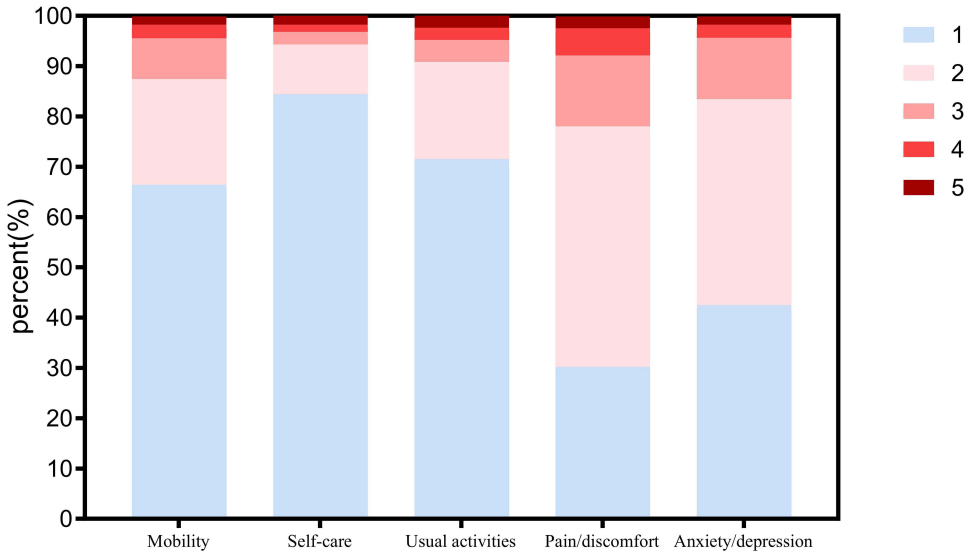

Figure 1 Patient-reported problems percentage in five levels of EQ-5D.

TCM Constitutional Types

A total of 2691 constitutional cases were analyzed, which is lower than the total number of patients due to missing items and the inability of some patients to receive a TCM constitutional diagnosis. Among these cases, 448 were classified as balanced constitution (16.6%), 674 as Yang-deficiency constitution (25.0%), 354 as dampness-heat constitution (13.2%), 318 as blood-stasis constitution (11.8%), 293 as Qi-deficiency constitution (10.9%), 233 as phlegm-dampness constitution (8.7%), 170 as Qi-stagnation constitution (6.3%), 112 as Yin-deficiency constitution (4.2%), and 89 as inherited-special constitution (3.3%) (Figure 2). The top three imbalanced TCM constitutional types across various cancers were predominantly Yang-deficiency, Dampness-heat, Blood-stasis, and Qi-deficiency. The distribution of TCM constitutional types among most cancer diagnoses showed statistical significance ($P<0.05$) (Table 4).

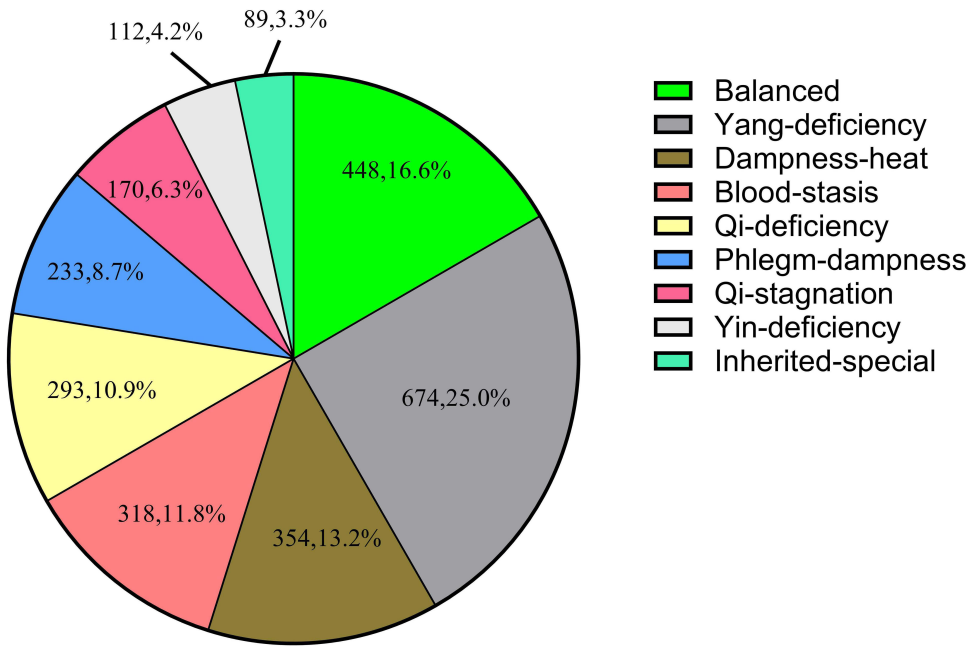

Figure 2 The distribution of the TCM constitution types.

Table 4 Comparative Analysis of TCM Constitution Types

Variables	Cancer primary site									
	Lung, n(%)	**Nasopharynx, n(%)**	**Hepatobiliary pancreas, n(%)**	**Thyroid, n(%)**	**Colorectal, n(%)**	**Gynecological, n(%)**	**Breast, n(%)**	**Esophagus, n(%)**	**Gastric, n(%)**	**Others, n(%)**
TCM Constitutional type										
Balanced	120(17.7)	34(14.5)	26(19.0)	11(12.2)	41(18.3)	54(14.9)	45(13.0)	37(18.7)	16(16.3)	64(19.9)
Qi-deficiency	97(14.3)*	17(7.2)	17(12.4)*	12(13.3)*	14(6.3)	33(9.1)	39(11.2)*	13(6.6)	10(10.2)	41(12.7)
Yang-deficiency	161(23.7)*	55(23.4)*	30(21.9)*	22(24.4)*	53(23.7)*	103(28.5)*	91(26.2)*	61(30.8)*	34(34.7)*	64(19.9)*
Yin-deficiency	31(4.6)	8(3.4)	1(0.7)	2(2.2)	6(2.7)	19(5.2)	27(7.8)	1(0.5)	4(4.1)	13(4.0)
Phlegm-dampness	63(9.3)	38(16.2)*	7(5.1)	9(10.0)	13(5.8)	17(4.7)	18(5.2)	15(7.6)	11(11.2)*	42(13.0)*
Dampness-heat	70(10.3)*	35(14.9)*	27(19.7)*	12(13.3)*	49(21.9)*	55(15.2)*	36(10.4)	20(10.1)*	11(11.2)*	39(12.1)*
Blood-stasis	68(10.0)	22(9.4)	13(9.5)	14(15.6)*	30(13.4)*	54(14.9)*	60(17.3)*	25(12.6)*	4(4.1)	28(8.7)
Qi-stagnation	50(7.4)	17(7.2)	10(7.3)	4(4.4)	6(2.7)	17(4.7)	23(6.6)	20(10.1)*	4(4.1)	19(5.9)
Inherited-special	18(2.7)	9(3.8)	6(4.4)	4(4.4)	12(5.4)	10(2.8)	8(2.3)	6(3.0)	4(4.1)	12(3.7)
Total	678(100.0)	235(100.0)	137(100.0)	90(100.0)	224(100.0)	362(100.0)	347(100.0)	198(100.0)	98(100.0)	322(100.0)
χ^2	22.47	23.77	13.63	4.64	31.87	19.51	35.30	20.72	11.03	19.09
P value	**0.004**	**0.003**	0.092	0.795	**<0.001**	**0.012**	**<0.001**	**0.008**	0.200	**0.014**

Notes: Statistically significant values are given in bold (P< 0.05); *The top three imbalanced TCM Constitutional types in each cancer type.

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Discussion

Cancer patients opting for TCM were predominantly female, middle-aged, and exhibited good performance status, similar to a survey conducted on patients from a hospital in Australia.[30] Most patients visiting the TCM clinic expressed willingness to boost their immune system and alleviate cancer-related symptoms, predominantly fatigue, disturbed sleep, poor appetite, and dry mouth. These symptoms were measured via two commonly used PROs instruments, offering a comprehensive assessment of symptom burden and HRQoL. With the largest sample size of cancer patients treated with TCM to date, our findings reaffirmed that TCM plays a crucial role in the supportive care of various cancer types and its broad acceptance across different age groups among cancer patients.

The high prevalence of breast and gynecological cancers among TCM patients may be attributed to the high proportion of females and younger age. However, lung cancer remains the predominant cancer type, consistent with findings from general cancer population studies.[40,41] The adverse effects of conventional cancer therapies often lead to a deterioration in patients' QoL,[42] whereas, TCM is widely acknowledged for its ability to alleviate treatment-related side effects and improve QoL.[43] Consequently, patients seeking initial consultation at TCM rehabilitation clinics often exhibit lower health utility scores. It is commonly believed that TCM possesses advantages as a way of supportive or palliative care to alleviate cancer-related symptoms during terminal stages, particularly when Western medical treatments provide no further options. However, recent studies indicated that TCM can play a significant role throughout the entire course of cancer treatment, including recovery stages after surgery, chemotherapy, or radiotherapy, rather than solely during the terminal stage.[18,44] For example, 19.8% of early-stage cancer patients with high EQ-5D-5L scores only received surgery, with their rehabilitation goals often focused on returning to normal life and maintaining employment. The extensive sample size of our study encompassed participants from all age groups, diagnoses, and stages of cancer, contributing to a robust and unbiased estimation of the general cancer population seeking TCM rehabilitation.

Cancer-related fatigue (CRF) was the most prevalent symptom that cannot be relieved by sleep or rest.[45,46] It substantially interferes with daily activities and diminishes patients' QoL. Currently, no standardized approaches exist for the treatment of CRF. Sleep disturbance was the most elevated self-reported symptom score and commonly treated with pharmacological treatments, including benzodiazepines, antidepressants, and antihistamines. However, the daily use of sleep-promoting medications is associated with various side effects, including drowsiness, dizziness, memory impairment, and an increased risk of psychiatric disorders.[47,48] Many cancer patients seek traditional, complementary, and integrative medicine (TCIM) to reduce the toxicity and enhance the therapeutic effects of Western medicine, aiming to address a myriad of unmet needs.[49] Integrating TCM with conventional cancer therapies could provide a holistic approach to improving patient outcomes, particularly in managing cancer-related symptoms and enhancing overall quality of life. TCM, such as traditional herbal medicine and acupuncture, is widely integrated into oncology departments in hospitals across China, alongside conventional cancer treatments, and has increasingly been incorporated into the management of cancer-related symptoms.[50,51] Consequently, there is a pressing need for further clinical research on TCM treatments, improved evidence-based education, and more patient-centered, accessible TCM therapies for cancer patients.[29]

Constitution classification is the basis and core content of TCM.[52] This study revealed that approximately 83.4% of cancer patients have a deviation in TCM constitution. Among these deviations, Yang-deficiency, Qi-deficiency, and Phlegm-dampness were identified as the most prevalent across various cancer types. However, the specific patterns of TCM constitutional deviations across cancer types are different, with Yang-deficiency and Qi-deficiency being more prevalent in lung and liver cancers,[53,54] while Qi-stagnation and Yin-deficiency are more common in breast cancer.[55,56] These differences may be influenced by biological factors, such as tumor microenvironment and metabolic dysregulation, as well as cultural factors, including lifestyle and dietary habits.[57] In previous studies, Yang-deficiency was significantly associated with CRF in cancer patients,[58,59] this may be attributed to disruption of mitochondrial metabolic activity.[60] Additionally, increased levels of inflammatory cytokines may contribute to fatigue by affecting the hypothalamus-pituitary-adrenal (HPA) axis, thereby inducing Yang-deficiency.[61] Dampness-heat constitution was a risk factor for chemotherapy-induced nausea and vomiting (CINV).[55] The CCMQ could serve as a clinical tool to identify cancer patients predisposed to severe cancer-related symptoms, providing TCM doctors with a basis for selecting an appropriate treatment based on TCM constitution. For instance, in cases of Qi-deficiency constitution, Panax ginseng is commonly

selected as the main Chinese herbal medicine incorporated into TCM prescriptions.[54] Similarly, Yang-deficiency constitution can be addressed through nonpharmaceutical interventions such as acupuncture and tai chi.[62] With the distribution pattern of TCM constitution in cancer patients provided in our analysis, Chinese medicine practitioners could conduct personalized therapy according to the TCM constitutional type, so as to adjust biased constitutions.

This study has several limitations. First, although the response rate exceeded 90%, which supports the reliability of the study findings, the presence of non-respondents and missing data means that not all participants were evaluated. However, the high response rate and robust sample size still provides valuable insights into the research question. Second, the study was conducted at a single cancer hospital in China. Despite the large sample size, which illustrated patient heterogeneity, the potential for selection bias cannot be excluded. Thus, future research should involve multi-center studies to improve the generalizability of the findings and minimize selection bias. Third, in this study, due to self-reported by patients, no clinical outcomes were collected. While PROs are inherently subjective, they often provide more accurate reflections of symptoms and functional status than objective clinical measurements, particularly in assessing daily functions.[63] Additionally, the inherent limitations of a baseline data analysis must be acknowledged, as the data could not reflect changes in symptom burden longitudinally nor support causal analysis. Future studies are warranted to profile symptom trajectories in cancer patients undergoing TCM treatment and examine their association with clinical outcomes.

Conclusion

In conclusion, TCM is not merely focused on palliative care; it plays a significant role throughout the entire course of cancer treatment, not only in the terminal stages. Cancer patients seeking TCM rehabilitation are a general cancer population across all ages, diagnoses, and disease stages. These patients often experience a heavy symptom burden and a poor HRQoL. Therefore, it is recommended to enhance the capabilities of TCM rehabilitation services and develop evidence-based TCM practice strategies in cancer hospitals. Furthermore, TCM rehabilitation knowledge among cancer patients and oncologists should be improved, thereby maximizing the therapeutic benefits of TCM in cancer rehabilitation. These findings can provide a foundation for future research and decision-making in supportive care for cancer patients undergoing TCM treatment.

Abbreviations

TCM, Traditional Chinese Medicine; PROs, Patient-reported outcomes; PROM, Patient-reported outcome measure; HRQoL, health-related quality of life; MDASI-TCM, MD Anderson Symptom Inventory for Traditional Chinese Medicine; EQ-5D-5L, EuroQol-5Dimensions-5Levels; VAS, Visual analog scale; CCMQ, Constitution in Chinese Medicine Questionnaire; CAM, Complementary and alternative medicine; CHM, Chinese herbal medicine; BMI, Body mass index; ECOG-PS, Eastern Cooperative Oncology Group score; REM, Relations with others, enjoyment of life, and mood; WAW, Walking, general activity, and work; SD, Standard deviation; IQR, Interquartile range; CRF, Cancer-related fatigue; TCIM, Traditional, complementary, and integrative medicine; CINV, Chemotherapy-induced nausea and vomiting.

Data Sharing Statement

The data and materials in this study are available from the corresponding author upon reasonable request.

Ethics Approval and Informed Consent

The study was reviewed and approved by the Ethics Committee for Medical Research and New Medical Technology of Sichuan Cancer Hospital (Approval Number: SCCHEC-02-2021-048 and KY-2021-004-03). The study complies with the Declaration of Helsinki.

Consent for Publication

All data sources and individual person's datum submitted were accepted for publication.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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