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Use of Chinese Herbal Medicine Therapies in Comprehensive Hospitals in Central China: A Parallel Survey in Cancer Patients and Clinicians*

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Summary: Chinese herbal medicine (CHM), as the largest application category of traditional Chinese medicine (TCM), is widely accepted among cancer patients in China. Herbal slice (HS) and Chinese patent drug (CPD) are commonly used CHM in China. This study aimed to investigate the utilization of CHM among clinicians and cancer patients in central China. Five hundred and twenty-five patients and 165 clinicians in 35 comprehensive hospitals in central China were asked to complete an anonymous questionnaire that was designed to evaluate the use of CHM. The results showed that 90.74% clinicians and 72.24% cancer patients used CHM during cancer treatment. The educational backgrounds of the clinicians and the age, education level, annual income, and cancer stage of the cancer patients were related to use of CHM. More than 90% clinicians and cancer patients had used CPD. Comparatively, the percentage of HS use was 10% lower than that of CPD use among clinicians and cancer patients. More clinicians preferred to use CHM after surgery than cancer patients did (20.41% *vs.* 5.37%). Enhancing physical fitness and improving performance status were regarded as the most potential effect of CHM on cancer treatment (85.71% among clinicians and 94.07% among cancer patients), in comparison with directly killing tumor cells (24.49% among clinicians and 31.36% among patients). As for refusal reasons, imprecise efficacy was the unanimous (100%) reason for clinicians' rejection of CHM, and 95.58% patients objected to using CHM also for this reason. Furthermore, the side effects of CHM were more concerned by clinicians than by patients (33.33% *vs.* 15.81%). In conclusion**,** our survey revealed that CHM was popularly accepted by clinicians and cancer patients in central China. The reasons of use and rejection of CHM were different between clinicians and cancer patients.

Traditional Chinese medicine (TCM) as the mainstream of complementary and alternative medicine (CAM) is widely accepted among cancer patients in China[1, 2]. It was reported that 80% or more cancer patients use TCM in China[3]. The proportion ranges from 7% to 64% worldwide[4, 5]. Chinese herbal medicine (CHM), as the principal category of TCM[2, 6], includes herbal slice (HS) and Chinese patent drug (CPD). The acceptance of CHM was reported to be different among cancer patients in Taiwan in terms of age, gender, and regional distribution[7]. Another study in China showed that 53.0% of cancer patients used CHM in the southwest China, where the economy is relatively backward[8], and more than 80% cancer patients used CHM in Shanghai district, which has a developed economy[3]. However, no study has been conducted to evaluate CHM use in central China. In addition, religious faith, family income, and education levels have never been investigated in these studies, which might be the factors related to CHM use.

TCM, as a part of CAM with an independent theoretical system, has been utilized for more than 5000 years in China and has made tremendous contributions to the multiplication and prosperity of the Chinese nation. Many policies have been instituted by the Chinese government to support TCM development since the foundation of People's Republic of China in 1949. Integrative medicine is advocated to combine with Western medicine in clinical practice in China. Thus, Western medicine courses are established in TCM universities, and TCM courses are taught in universities of Western medicine in China. Furthermore, medical training is unique in China. 98% physicians must receive some TCM training and graduates of TCM universities in China are fully trained and authorized to carry out allopathic Western medicine treatments[9]. Besides, 95% Chinese hospitals have a TCM department[10]. In China, CHM is prescribed to cancer patients by clinicians from the department of Western medicine, TCM or integrative medicine. An international pilot study of oncologists' opinions and practices on CAM indicated that views and practices differ between oncologists from mainland China and Taiwan, China, and those from the United States[11], but the reasons for differences in CAM practice patterns among oncologists are not clear.

Numerous experimental and clinical studies have demonstrated the efficacy of CHM in the treatment of malignant tumors and they conclude that CHM can enhance physical fitness and improve performance[12, 13],

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alleviate the side effects of chemoradiotherapy[14–16], synergize chemoradiotherapy to prolong survival[17–19], prevent relapse[20], directly kill tumor cells[21, 22], and serve other purposes such as regulating immunomodulatory activities[23]. However, the role of CHM in the treatment of malignant tumors remains controversial, and some clinical trials even negate its effect[24]. In the present study, we conducted a parallel survey among clinicians and cancer patients to assess the factors that influenced CHM use and the attitudes of physicians and patients towards the use of CHM for cancer treatment.

1 SUBJECTS AND METHODS

1.1 Survey

Thirty-five hospitals were selected from 58 comprehensive hospitals in central China. Five clinicians and 15 cancer patients were surveyed in each selected hospital. Clinicians and patients were recruited from outpatient and inpatient departments. Eligible patients were required to be over age 18, and had a definite current or past diagnosis of cancer; they could not only be able to communicate in Mandarin Chinese but also perfectly understand the request and had follow-up appointments with the physician. The recruited clinicians were limited to those from departments of surgical oncology, medical oncology, radiation oncology, integrated medicine, or traditional Chinese medicine and they specialized in the diagnosis and treatment of malignant cancer. The surveys were conducted by responsible investigators. An anonymous questionnaire was filled out by each recruited patient and clinician. It comprised three parts, and was a modified version developed by Swisher[25] and Liu[8].

The nature and potential risks of the study were explained to all the subjects before obtaining their written informed consents. The investigation protocol was approved by the Ethics Committee of Tongji Hospital affiliated to Tongji Medical College and it followed the ethical principles outlined in the Declaration of Helsinki.

1.2 Statistical Analysis

Chi-squared tests were used to test the association between the use of CHM and each independent demographic and relative variable. Descriptive statistics were calculated for the views of patients versus those of physicians, and Chi-squared tests of independence was conducted to determine if the difference was statistically significant by using an alpha level of ≤ 0.05 as the cutoff point. Two-sided tests were conducted.

2 RESULTS

2.1 Demographics

A total of 165 oncologists from 35 comprehensive hospitals in central China were surveyed. One hundred and sixty-two questionnaires were qualified for analysis and 3 (1.82%) were excluded for incomplete information. Male clinicians and female clinicians accounted for 66.67% and 33.33%, respectively. 56.79% were between the age of 30 and 50 years old and intermediate-level clinicians made up 48.77% respondents. As for educational background, there were 62.96% clinicians with Western medicine backgrounds, 21.61% with TCM backgrounds, and 15.43% with integrative medicine backgrounds.

A total of 490 questionnaires were qualified for analysis with 525 cancer patients being surveyed, and 6.67% (n=35) questionnaires were excluded for incomplete information. There were 57.14% (n=280) male patients and 43.86% (n=210) female patients. 55.71% patients were over 50 years old. As for education level, patients with junior school or lower accounted for 36.53% (n=179), senior school education for 40.82% (n=200) and university-level education or higher for 22.65% (n=111). Patients with religious faith were comprised of 14.90% (n=73) of respondents, and most of respondents (85.10%) reported no religious faith. The average annual household income of more than 70% patients ranged from ¥30 000 to ¥100 000. Among them, the percentage of ¥30 000 to ¥60 000 was 40.61% (n=199), and that of ¥60 000 to ¥100 000 was 30.82%. More than 60% patients had intermediate-stage tumors (28.57%) and advanced-stage tumors (32.86%). Additionally, 24.08% (n=118) of patients were at an unclear tumor stage.

2.2 Use of CHM among Clinicians and Patients

As shown in tables 1 and 2, 90.74% clinicians used CHM, and only 9.26% (n=15) did not. It was found that the gender, age, work department, and professional level of clinicians were not decisive factors (P>0.05) by comparing the demographic characteristics between the clinicians who used CHM to treat cancer and those who did not. Educational background played an important role in the use of CHM by clinicians. The clinicians with Western medicine backgrounds more frequently refused to use CHM, accounting for 13.73% (14/102). In contrast, the clinicians with TCM and integrative medicine backgrounds rarely refused to use CHM in cancer treatment, with the percentage being only 1.67% (1/60).

Among the 490 cancer patients, 354 patients used CHM with a percentage of 72.24%; the percentage of those who rejected CHM in cancer treatment was 27.76% (n=136). More than half of patients, 54.52% (n=193), had CHM recommended to them by physicians, and 29.10% (n=103) of them chose to use it of their own accord or influenced by their family members. It was found that use of CHM by cancer patients during treatment was not associated with either gender or religious faith (P>0.05), but factors such as age, education level, average annual household income and cancer stage were relative to the CHM use. Most patients over age 50 [77.65% (212/273)] were willing to use CHM, whereas 41.29% (20/39) of cancer patients who were less than 30 years old refused to use CHM, and there was a statistically significant difference (P<0.01). The percentage of CHM acceptance was the highest (77.50%) among patients with senior middle school education level, and 39.63% patients with university-level or higher education rejected CHM. CHM acceptance differed among cancer patients with different annual household incomes. The acceptance of CHM was lower (60.42%) in patients with annual family incomes ≥¥100 000, and cancer patients with annual household incomes of ¥30 000–¥60 000 and ¥60 000–¥100 000 were more likely to accept CHM, with the percentage being 77.89% and 72.19%, respectively. In terms of cancer stages, the acceptance rate (83.23%) among late-stage patients was highest; the lowest acceptance rate (53.52%) occurred in the early-stage patients. The data are shown in table 3 and table 4.

Table 1 Use of CHM among clinicians

Variable		Clinicians [% (*n*)]
CHM use		
	Yes	90.74 (147)
	No	9.26 (15)
Drug category		
	CPD	64.63 (95)
	HS	8.16 (12)
	Both	27.21 (40)
CHM use time		
	Throughout treatment	31.97 (47)
	After surgery	20.41 (30)
	During chemoradiotherapy	13.61 (20)
	After chemoradiotherapy	34.01 (50)
Advantage of CHM		
	Fewer side effects	74.83 (110)
	Economic superiority	57.14 (84)
	Better treatment compliance	46.94 (69)
Stage suitable for CHM		
	Early	50.34 (74)
	Intermediate	57.14 (84)
	Late	67.35 (99)
Potential effects of CHM		
	Directly killing tumor cells	24.49 (36)
	Enhancing physical fitness and improving performance status	85.71 (126)
	Synergizing chemoradiotherapy	39.46 (58)
	Preventing relapse	61.90 (91)
	Alleviating side effects of chemoradiotherapy	53.06 (78)
	Others	9.52 (14)
Reasons for rejecting CHM		
	Imprecise efficacy	100 (15)
	Side effects	33.33 (5)
	Possibly reducing the effectiveness of chemoradiotherapy	20 (3)
	Others	0 (0)

Table 2 Analysis of factors associated with CHM use among clinicians

Variable		Respondents (*n*)	User [% (*n*)]	Non-user [% (*n*)]	χ^2	*P*
Gender						
	Male	108	92.59 (100)	7.41 (8)	1.32	>0.05
	Female	54	87.04 (47)	12.96 (7)		
Age						
	≤30 years old	41	85.37 (35)	14.63 (6)	1.90	>0.05
	30–50 years old	92	92.39 (85)	7.61 (7)		
	≥50 years old	29	93.10 (27)	6.90 (2)		
Professional level						
	Primary	45	91.11 (41)	8.89 (4)	1.16	>0.05
	Middle	79	88.61 (70)	11.39 (9)		
	Senior	38	94.74 (36)	5.26 (2)		
Professional background						
	Physician	78	88.46 (69)	11.54 (9)	7.11	>0.05
	Surgeon	27	92.59 (25)	7.41 (2)		
	TCM practitioner	37	100 (37)	0 (0)		
	Others	20	80.00 (16)	20.00 (4)		
Educational background						
	Western medicine	102	86.27 (88)	13.73 (14)	6.82	0.01
	TCM	35	100 (35)	0 (0)		–0.05
	Integrative medicine	25	96.00 (24)	4.00 (1)		

Table 3 Use of CHM among cancer patients

Variable		Patients [% (*n*)]
CHM use		
	Yes	72.24 (354)
	No	27.76 (136)
Person influencing patients' decision		
	Doctor	54.52 (193)
	Themselves and their families	29.10 (103)
	Friends	13.28 (47)
	Others	3.11 (11)
CHM effectiveness		
	Effective	68.64 (243)
	Ineffective	2.54 (9)
	Unidentified	28.81(102)
Drug category		
	CPD	61.58 (218)
	HS	7.63 (27)
	Both	30.79 (109)
CHM use time		
	Throughout treatment	33.90 (120)
	After surgery	5.37 (19)
	During chemoradiotherapy	16.67 (59)
	After chemoradiotherapy	44.06 (156)
Potential effects of CHM		
	Directly killing tumor cells	31.36 (111)
	Enhancing physical fitness and improving performance status	94.07 (333)
	Synergizing chemoradiotherapy	38.70 (137)
	Preventing relapse	50.00 (177)
	Alleviating side effects of chemoradiotherapy	63.28 (224)
	Other	11.58 (41)
Reasons for rejecting CHM		
	Imprecise efficacy	95.58 (130)
	Side effects	15.81 (56)
	Possibly reducing the effectiveness of chemoradiotherapy	22.60(80)
	Other	8.47 (30)

Table 4 Analysis of CHM use and evaluations of cancer patients

Variable		All respondents (*n*)	User [% (*n*)]	Non-user [% (*n*)]	χ^2	*P*
Gender						
	Male	280	71.79 (201)	28.21 (79)	0.07	＞0.05
	Female	210	72.86 (153)	27.14 (57)		
Age						
	≤30 years old	39	48.72 (19)	41.29 (20)	14.97	＜0.01
	30–50 years old	178	69.66 (124)	30.34 (54)		
	≥50 years old	273	77.65 (212)	22.35 (62)		
Education level						
	≤Junior middle school	179	73.74 (132)	26.26 (47)	10.77	＜0.01
	Senior middle school	200	77.50 (155)	22.50 (45)		
	≥University	111	60.36 (67)	39.63 (44)		
Religious faith						
	Yes	73	79.45 (58)	20.55 (15)	2.34	＞0.05
	No	417	70.74 (295)	29.26 (122)		
Annual income						
	≤¥30,000	92	66.30 (61)	33.70 (31)	8.13	0.01–0.05
	¥30 000–¥60 000	199	77.89 (155)	22.11 (44)		
	¥60 000–¥100 000	151	72.19 (109)	27.81 (42)		
	≥¥100 000	48	60.42 (29)	39.58 (19)		
Cancer stage						
	Unclear	118	72.03 (85)	27.97 (33)	22.72	＜0.01
	Early	71	53.52 (38)	46.48 (33)		
	Intermediate	140	69.29 (97)	30.71 (43)		
	Late	161	83.23 (134)	16.77 (27)		

Table 5 Comparison of CHM use between clinicians and patients

Variable		Clinicians [% (*n*)]	Patients [% (*n*)]	χ^2	*P*
CHM use					
	Yes	90.74 (147)	72.24 (354)	23.40	＜0.01
	No	9.26 (15)	27.76 (136)		
Drug category					
	CPD	64.63 (95)	61.58 (218)	0.64	＞0.05
	HS	8.16 (12)	7.63 (27)		
	Both	27.21 (40)	30.79 (109)		
CHM use time					
	Throughout treatment	31.97 (47)	33.90 (120)	27.31	＜0.01
	After surgery	20.41 (30)	5.37 (19)		
	During chemoradiotherapy	13.61 (20)	16.67 (59)		
	After chemoradiotherapy	34.01 (50)	44.06 (156)		
Potential effects of CHM					
	Directly killing tumor cells	24.49 (36)	31.36 (111)	6.77	＞0.05
	Enhancing physical fitness and improving performance	85.71 (126)	94.07 (333)		
	Synergizing chemoradiotherapy	39.46 (58)	38.70 (137)		
	Preventing relapse	61.90 (91)	50.00 (177)		
	Alleviating side effects of chemoradiotherapy	53.06 (78)	63.28 (224)		
	Others	9.52 (14)	11.58 (41)		
Reason for rejecting CHM					
	Imprecise efficacy	100 (15)	95.58 (130)	6.15	＞0.05
	Side effects	33.33 (5)	15.81 (56)		
	Possibly reducing the effectiveness of chemoradiotherapy	20 (3)	22.60 (80)		
	Others	0 (0)	8.47 (30)		

2.3 Comparison of CHM Use between Clinicians and Patients

There was a statistically significant difference in the CHM use proportion between the clinicians and the cancer patients. A higher proportion of clinicians used CHM than the cancer patients did (90.74% *vs.* 72.24%; $P<0.01$). 68.64% patients regarded CHM as an effective treatment, 2.54% of patients reported it completely ineffective, and 28.81% could not determine the effect of Chinese herbs on their cancer treatment (data not shown in the tables). However, the physicians appeared to have more confidence in the effect of CHM. More than 90% (90.74%) of physicians thought it necessary to use CHM in the tumor treatment.

There was a statistically significant difference in the timing of CHM use between the clinicians and the patients. 20.41% clinicians used CHM after surgery, while the proportion of patients was only 5.37%. Compared with the clinicians, 34.01% of whom selected the use of CHM after chemoradiotherapy, more cancer patients (44.06%) were willing to accept CHM treatment at this time. Cancer patients reported a higher frequency of CHM use during chemoradiotherapy than did the clinicians (16.67% *vs.* 13.61%), but the frequencies of CHM use throughout the entire cancer treatment process were comparable between patients and clinicians, which were 31.97% and 33.90%, respectively.

There were no statistical difference between clinicians and patients in terms of drug category, views about the potential effectiveness of CHM on cancer treatment and reasons for rejecting CHM.

Most patients and clinicians preferred to use CPD (61.58% and 64.63%, respectively), and few of them chose to use HS (7.63% in patients and 8.16% in clinicians). Cancer patients and clinicians reported similar benefits of CHM. Both groups believed CHM could enhance physical fitness and improve performance (94.07% and 85.71%, respectively), and 24.49% patients and 31.36% clinicians assumed that CHM could directly kill tumor cells. More clinicians than patients preferred to use CHM to prevent relapse (61.90% *vs.* 50.00%), and fewer clinicians believed the treatment could directly kill tumor cells (24.49% *vs.* 31.36%). 39.46% patients and 38.70% clinicians chose synergizing the effects of chemoradiotherapy as a potential effect of CHM.

Clinicians rejected CHM for cancer treatment unanimously because of the imprecise efficacy of CHM; 95.58% of patients also objected to using CHM for this reason. In addition, side effects and the possibility of reducing the effectiveness of chemoradiotherapy were also considered by 20% physicians and 22.60% patients. Nevertheless, more physicians concerned about side effects than the patients (33.33% *vs.* 15.81%). Data are shown in table 5.

3 DISCUSSION

CHM is the main use modality of TCM, which is supported by the insurance system in China. Its use levels among Chinese cancer patients and clinicians are exceptionally high. In our results, 90.74% of clinicians and 72.24% of cancer patients reported using CHM for cancer treatment. Surprisingly, the percentage of clinicians was even higher than that of cancer patients, with a statistically significant difference found. This result indicated that some cancer patients didn't follow the clini-

cian's prescription, and the phenomena that 54.52% patients had used CHM based on the strong support of their physicians might provide the possible clue for this result. For factors relative to CHM use, our results indicated that only educational background was a single effective factor; other variables, like gender, age, professional experience and professional background, were not decisive factors among the clinicians. However, among cancer patients, age, education level, annual income, and cancer stage were related to use of CHM. Unexpectedly, religious faith was not a related factor, which might be attributed to the small sample size of respondents who reported having religious faith in the study (73/417).

In addition, CHM acceptance levels were found to be associated with economic factors. Our investigation indicated that CHM was accepted by 72.24% of cancer patients in central China. The acceptance level was higher than that in southwest China (53%) where the economic development is relatively low[8], but it was lower than that (approximately 80%) in eastern China where the economic development is very high[3]. Furthermore, CHM acceptance differed among cancer patients with different annual household incomes. CHM acceptance was lower among patients with family incomes ≥¥100 000 and ≤¥30 000 than among cancer patients with annual household incomes in the ranges of ¥30 000–¥60 000 and ¥60 000–¥100 000, with the percentages being 77.89% and 72.19%, respectively. CHM acceptance was highest among patients with senior middle school education (77.50%), and rejection of CHM was highest among patients with university-level education or higher (39.63%).

CPD as a CHM modality with distinct Chinese characteristics has an extensive market in China because of its convenience of use[26]. Our results showed that more than 90% clinicians and cancer patients had chosen CPD. Comparatively, the rate of HS use was less than 10% among both clinicians and cancer patients. The advantage of CPD is convenience for use, because the majority of these medications are made into capsules, powders or tablets without needing further decoction. Nevertheless, use of CPD makes it impossible to individually tailor the treatment, which potentially influences the effects of decoction[27].

Our study found that there was a statistically significant difference in the timing of CHM use between clinicians and cancer patients. More clinicians preferred to use CHM after surgery, but CHM use after chemoradiotherapy was the primary choice of cancer patients. Cancer patients reported a higher degree of use during their chemoradiotherapy, although CHM use throughout the entire cancer treatment process was similar between patients and clinicians. The results indicated that clinicians intended to improve patients' performance after surgery by using CHM, whereas patients preferred to treat cancer after chemoradiotherapy.

Different views of clinicians and patients on the use of CHM prompted scholars to conduct a series of clinical cancer treatment trials on CHM. Improving the quality of life[28–30], reducing cytotoxicity[31, 32], enhancing efficacy[33–35], and preventing cancer recurrence and metastasis[36] are the most frequently cited effects of using CHM in cancer treatment. In the present study, both patients and clinicians most frequently chose enhancing physical fitness and improving performance and least frequently selected directly killing tumor cells as the reasons for CHM use. As for refusal reasons, imprecise efficacy was unanimously (100%) chosen by clinicians as the reason to reject CHM, and 95.58% of patients objected to CHM use for the same reason. Additionally, more physicians than patients concerned about the side effects of CHM therapies (33.33% *vs.* 15.81%). Clinical trials with higher evidence levels need to be conducted to prove the definite effects of CHM in the future, particularly its effects on enhancing physical fitness and improving performance.

In conclusion, our survey revealed the current status and some related factors of CHM use among clinicians and cancer patients in central China. This comparative study showed different attitudes of clinicians and cancer patients toward CHM use and provided scientific evidence for the development of clinical trials and policy-making on CHM.

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Conflict of Interests Statement

The authors declare that there is no conflict of interest with any financial organization or corporation or individual that can inappropriately influence this work.

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