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ORIGINAL RESEARCH

Family Members' Perspectives on Integrative Chinese-Western Medicine in Cancer Care

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Purpose: Family members play a central supporting role in cancer patient management. This study aimed to assess the knowledge, attitudes, and practices (KAP) of cancer patients' family members regarding the use of integrative Chinese-Western medicine in cancer treatment. Proper knowledge is necessary for informed decision-making and providing adequate care and support.

Methods: This cross-sectional study was conducted between August 2022 and December 2022 and included family members of cancer patients.

Results: A total of 493 questionnaires were collected. The mean score of knowledge, attitudes, and practices were 5.87 ± 3.63 (possible range: 0–12), 59.90 ± 9.45 (possible range: 16–80), and 21.73 ± 3.27 (possible range: 6–30), respectively. Junior college (university programs lasting 2–3 years) or above (OR=2.87, 95% CI: 1.41–5.88, P=0.004), had family members attending Chinese Medicine/Integrated Chinese and Western Medicine departments (OR=1.94, 95% CI: 1.17–3.24, P=0.011), and possessed knowledge of TCM (OR=2.90, 95% CI: 1.76–4.79, P<0.001) were linked to good knowledge. Knowledge (OR=1.96, 95% CI: 1.23–3.11, P=0.005) and family members attending Chinese Medicine/Integrated Chinese and Western Medicine departments (OR=2.10, 95% CI: 1.27–3.47, P=0.004) were linked to positive attitudes. Attitude (OR=5.65, 95% CI: 3.57–8.93, P<0.001) was linked to positive practices.

Conclusion: The family members of cancer patients showed limited knowledge and moderate attitudes and practices. Efforts should be made to address the benefits of integrative Chinese-Western medicine and provide more access to education and resources related to TCM. Although research would be necessary, the present study could provide hints regarding the combination of modern and traditional medicine in other countries.

Keywords: cross-sectional study, knowledge, attitudes, practice, traditional Chinese medicine, cancer

Introduction

Cancer is a major burden of disease and one of the leading causes of death worldwide.[1] Cancer patients experience various concurrent symptoms that considerably affect their physical and social functions and quality of life.[2,3] Western medicine (ie, surgery, chemotherapy, and radiotherapy) primarily focuses on tumor eradication and symptom management, but these treatments can lead to severe side effects.[4] Traditional Chinese medicine (TCM) (encompassing herbal treatments, acupuncture, moxibustion, and tai chi) regards cancer as a disturbance of the body's harmony and aims at restoring body balance and enhancing the immune system.[4,5] TCM can reduce cancer-related symptoms and side effects of chemotherapy and radiotherapy.[6–8] TCM-based Chinese herbal medicine has also shown promising therapeutic effects as an adjunctive cancer treatment.[9] Indeed, the combination of traditional Chinese and Western medicine adds Chinese medicine to boost immunity to the chemotherapy regimen, which can improve the patient's immune function, inhibit cancer cells and enhance the anti-cancer ability, and the curative effect is more significant.[10] Real-world evidence is

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available to support the use of integrated TCM and Western medicine.[11] Integrated TCM and Western medicine aim for the two approaches to be complementary to each other, with TCM counterbalancing the body disharmony induced by Western treatments.[12] In China, physicians are cross-trained in both TCM and Western medicine.[13] Even though these two disciplines are different in their philosophies and methodologies, TCM and Western medicine can complement each other's strengths and create synergistic effects when used together,[14] including in chronic diseases[15–17] and cancer.[18–20] Therefore, it is important to promote the effective application of integrative Chinese-Western medicine to improve the quality of cancer care and patients' quality of life.

Family members of cancer patients play a critical role in cancer management and medical decision-making related to cancer care, and they must have adequate knowledge to make informed treatment decisions. In the Chinese culture, it is not unusual for family members to take an active part in decision-making for their sick family member,[21,22] emphasizing the importance of possessing proper knowledge and cultivating positive attitudes. Studies have shown that family members of Chinese cancer patients have high information needs, and the failure to meet these needs can increase the risk of poor cancer outcomes.[23,24] Furthermore, cancer patients in China have a strong demand for TCM rehabilitation, but related knowledge is not well-provided by healthcare providers.[25] Furthermore, shared decision-making is an important component of patient-centered care, and it involves patients, their families, and healthcare providers working together to make decisions about the patient's care. In shared decision-making, based on the information about the patient's health conditions, prognosis, and potential risks and benefits of treatment options, patients and their families make informed medical decisions that align with their values and preferences. Although families can be valuable sources of support and information for the patient, family members often assume a dominant role in shared decision-making, which might be aligned with the patient's wishes.

Several studies are available on the knowledge, attitude, and practice (KAP) of patients with cancer[26–28] and healthcare professionals[29] toward Western medicine and TCM (or other traditional medicines), but there is a lack of evidence on the KAP of integrative Chinese-Western medicine about family members of cancer patients. Previous studies reported poor-to-moderate KAP of family members of patients with chronic diseases.[30,31] Indeed, caretakers play a pivotal role in cancer management by helping the patients take care of themselves when they are tired or under heavy side effects, supporting them morally and psychologically, and taking care of daily life, with a heavy toll on their own quality of life and mental health.[32,33] Hence, a better understanding of their perceptions and practices could help clinicians and researchers design effective education programs to help them make informed decisions and enhance the quality of cancer care. A KAP survey is a quantitative methodology widely used in health-related topics and is based on the principle that knowledge influences behavior and disease management practices.[34]

Therefore, this study aimed to assess the KAP toward integrative Chinese-Western medicine in treating cancer among family members of cancer patients and to identify factors related to the levels of KAP.

Methods

Study Design

This cross-sectional study was conducted between August and December 2022.

Participants

This study included family members of oncology patients as participants.

Survey

According to the Clinical Practice Guidelines of Chinese Medicine in Oncology and the Clinical Practice Guidelines for cancer-related fatigue in the First Affiliated Hospital of Anhui Medical University, the Hefei Cancer Hospital of the Chinese Academy of Sciences, and the Hefei BOE Hospital, a self-designed questionnaire containing four dimensions was designed and modified with reference to comments made by four experts (two Chinese and Western medical oncologists and two statisticians) to confirm content validity and make adjustments. A small pre-test (33 copies) was conducted before the formal placement, with Cronbach's α=0.8941, suggesting a high degree of internal consistency. The

pre-test participants were requested to report any ambiguous or difficult-to-understand items to determine face value. The overall data reliability was 0.951, with dimension reliabilities of 0.868 (knowledge), 0.917 (attitude), and 0.929 (practice). The overall KMO value was 0.952.

The final questionnaire includes: 1) Demographic information, including the participant's gender, age, residence, education, work status, income, family member's illness, the department they consulting, type of medical insurance, and whether or not they received Chinese medicine treatments; 2) Knowledge dimension, which consists of 12 questions, with 1 point for correct answers and 0 points for wrong answers, ranging from 0–12 points; 3) Attitude dimension, containing 9 questions with 16 items, all using a 5-point Likert scale, ranging from very positive (5 points) to very negative (1 point), with scores ranging from 16–80 points; 4) Practice dimension, containing 6 questions with 15 items using a 5-point Likert scale, from very positive (5 points) to very negative (1 point). There are 10 items under Question 6, and the average score of the 10 items counts as the scoring for Question 6; therefore, the total practice score ranges from 6–30 points. The higher the score, the better the knowledge and the more positive the attitudes and practices. Scores were calculated based on their responses to assess the participants' level of knowledge, attitude, and practice. The scores were categorized according to Bloom's method.[35] Scores equal to or greater than 80% of the total score were classified as good or positive, while scores between 60% and 80% were considered moderate. Scores below 60% were deemed poor.

Data Collection

In order to ensure that only the family members of oncology patients participated in this study, the questionnaire was administered in the integrated Chinese and Western medicine oncology ward in the First Affiliated Hospital of Anhui Medical University, the medical oncology ward in Hefei Cancer Hospital of the Chinese Academy of Sciences, and the medical oncology ward in Hefei BOE Hospital. In order to ensure the quality and completeness of the questionnaire results, 10 assistants were trained in structured questionnaire data collection. The training included communication skills, questionnaire interpretation, and the possible reasons for poor data collection. The paper questionnaire was completed by the participants themselves. During the completion process, any unclear words and statements and questions raised by the participants would be responded to and explained by research assistants while taking particular care to answer objectively without influencing the participant's opinions or thoughts. The research assistant remained unobtrusive and out of view but within hearing range during questionnaire completion. After the participants had completed the questionnaire, the assistants checked it to ensure that participants had answered every question. All the questionnaires were coded, and all the data were cleaned and entered into Excel. Incomplete questionnaires were excluded.

Ethical Considerations

This study was ethically approved by the Clinical Medical Research Ethics Committee of the First Affiliated Hospital of Anhui Medical University (Quick-PJ 2023-04-37), and informed consent was obtained from all participants.

Statistical Analysis

The sample size was calculated using the formula for cross-sectional studies: α=0.05,n $= \left(\frac{Z_{1-\alpha/2}}{\delta}\right)^2 \times p \times (1-p)$ where $Z_{1-\alpha/2} = 1.96$ when α=0.05, the assumed degree of variability of p=0.5 maximizes the required sample size, and δ is an admissible error (which was 5% here). To account for potential attrition during the study, the theoretical sample size of 480 includes an additional 20% of participants.

SPSS 26.0 (IBM Corp., Armonk, NY, USA) was used for statistical analysis. The continuous variables were tested for normal distribution using the Kolmogorov–Smirnov test. The continuous variables were expressed as means ± standard deviations (SD), and group comparisons were analyzed using ANOVA. The categorical variables were expressed as n (%) and analyzed using the chi-square test. Pearson correlation was used to analyze the correlation between knowledge scores, attitude scores, and practice scores. Univariate and multivariate logistic regression were used to analyze the factors influencing practice, and variables with $p<0.05$ in univariate analysis were included in the multivariate regression. Multicollinearity refers to a situation where two or more independent variables are highly correlated with each other, making it difficult to isolate the individual effect of each variable on the dependent variable, leading to unreliable and

unstable estimates of the regression coefficients. Multicollinearity was detected by examining the correlation matrix between independent variables and by using the variance inflation factor (VIF), with a high VIF value indicating a multicollinearity problem.[36] Since the range of participants' ages was 18–78, for a difference of 60, the patients were divided into 30-year age groups. All statistical analyses were performed using two-sided tests, and P<0.05 were considered statistically significant.

Results

Participants' Characteristics

A total of 493 questionnaires were collected (aged 18–78 years old, 52.7% males) (Table 1). Over half of the participants were male (52.7%), aged 48 (median) to 78 (52.7%), and lived in non-urban areas (62.9%). The majority of participants attended primary school or below for education (55.4%), followed by college and above (25.6%) and high school or technical secondary school (19.1%). Only 28.4% of the participants were employed. Around 37% had a monthly per

Table 1 Baseline Characteristics and KAP Scores

Variables	n (%)	Knowledge Score		Attitude Score		Practice Score	
		Mean ± SD	P	Mean ± SD	P	Mean ± SD	P
Total	493	5.9 ± 3.6		59.9 ± 9.5		21.7 ± 3.3	
Gender			0.033		0.736		0.331
Male	260 (52.7)	5.5 ± 3.8		60.0 ± 10.1		21.6 ± 3.3	
Female	233 (47.3)	6.2 ± 3.4		59.8 ± 8.7		21.9 ± 3.3	
Age			0.008		0.036		0.549
18–47	233 (47.3)	6.3 ± 3.6		60.8 ± 9.0		21.6 ± 3.1	
48–78	260 (52.7)	5.5 ± 3.6		59.1 ± 9.7		21.8 ± 3.5	
Residence			<0.001		0.263		0.860
Urban	183 (37.1)	6.7 ± 3.5		60.5 ± 8.6		21.7 ± 3.1	
Non-Urban	310 (62.9)	5.4 ± 3.6		59.5 ± 9.9		21.8 ± 3.4	
Education			<0.001		0.027		0.639
Primary School or below	273 (55.4)	2.0 ± 3.6		58.9 ± 9.8		21.7 ± 3.4	
High School/Technical secondary school	94 (19.1)	6.4 ± 3.3		60.7 ± 9.0		22.0 ± 3.2	
Junior college or above	126 (25.6)	7.4 ± 3.5		61.5 ± 8.8		21.6 ± 3.0	
Working state			<0.001		0.019		0.045
Employed	140 (28.4)	6.9 ± 3.5		61.2 ± 9.2		21.5 ± 2.9	
Unemployed	97 (19.7)	4.7 ± 3.4		58.7 ± 8.8		22.2 ± 3.4	
Retired	49 (9.9)	6.4 ± 3.2		60.1 ± 8.3		22.2 ± 3.0	
Self-employed	30 (6.1)	5.9 ± 4.1		62.1 ± 9.6		21.9 ± 3.8	
Homemakers	68 (13.8)	6.5 ± 3.4		61.3 ± 9.3		22.3 ± 2.8	
Other	109 (22.1)	5.1 ± 3.8		57.7 ± 10.5		21.0 ± 3.8	
Monthly income, yuan			<0.001		0.020		0.454
<2000	167 (33.9)	4.8 ± 3.5		58.5 ± 11.0		21.4 ± 3.8	
2000–5000	186 (37.7)	6.2 ± 3.6		60.5 ± 8.4		21.9 ± 2.9	
5000–10,000	100 (20.3)	6.3 ± 3.8		59.6 ± 9.0		21.8 ± 3.1	
10,000–20,000	23 (4.7)	8.4 ± 2.0		64.1 ± 7.2		21.6 ± 3.1	
>20,000	17 (3.4)	6.7 ± 3.0		63.6 ± 7.1		22.6 ± 3.0	
Type of cancer your family member suffers from			0.072		0.174		0.057
Lung cancer	102 (20.7)	6.9 ± 3.4		61.0 ± 9.6		22.2 ± 3.2	
Stomach Cancer	80 (16.2)	6.0 ± 3.4		61.2 ± 8.8		22.1 ± 3.4	
Bowel Cancer	63 (12.8)	5.4 ± 3.1		59.3 ± 9.3		21.2 ± 3.1	
Breast Cancer	31 (6.3)	6.0 ± 3.3		59.1 ± 8.8		22.1 ± 3.2	
Head and Neck Tumor	17 (3.4)	5.5 ± 4.6		63.9 ± 8.3		23.3 ± 2.9	
Liver Cancer	17 (3.4)	6.1 ± 3.2		61.4 ± 10.9		20.7 ± 4.5	
Ovarian Cancer	17 (3.4)	5.5 ± 3.7		58.7 ± 10.5		20.5 ± 3.2	
Other	166 (33.7)	5.4 ± 4.0		58.6 ± 9.6		21.5 ± 3.2	

(*Continued*)

Table 1 (Continued).

Variables	n (%)	Knowledge Score		Attitude Score		Practice Score	
		Mean ± SD	P	Mean ± SD	P	Mean ± SD	P
Patient's department			<0.001		<0.001		<0.001
Oncology	229 (46.5)	5.0 ± 3.3		56.6 ± 9.6		20.9 ± 3.6	
Chinese Medicine/Integrative Chinese-Western Medicine	264 (53.6)	6.6 ± 3.7		62.8 ± 8.3		22.5 ± 2.7	
Type of medical insurance of your family (Multiple choice)			-		-		-
New Cooperative Medical insurance	319 (64.7)	5.5 ± 3.6		59.5 ± 9.6		21.7 ± 3.3	
Basic medical insurance for urban employees	111 (22.5)	7.1 ± 3.2		62.1 ± 8.6		22.1 ± 3.1	
Basic medical insurance for urban residents	58 (11.8)	5.7 ± 4.2		58.5 ± 10.0		21.2 ± 3.2	
Medical insurance for retired cadres	6 (1.2)	6.0 ± 4.2		58.2 ± 9.0		23.0 ± 3.5	
Commercial insurance	2 (0.4)	10.5 ± 0.7		54.5 ± 2.1		19.5 ± 0.3	
No insurance	1 (0.2)	5.0		62.0		23.7	
Does your family member receive Chinese medicine?			<0.001		<0.001		0.003
Yes	252 (51.1)	7.0 ± 3.4		62.0 ± 8.9		22.2 ± 3.1	
No	179 (36.3)	4.7 ± 3.5		57.1 ± 9.2		21.1 ± 3.3	
Unclear	62 (12.6)	4.7 ± 3.6		59.6 ± 10.4		21.7 ± 3.5	
Do you have any knowledge of Chinese medicine?			<0.001		<0.001		0.004
Yes	249 (50.5)	7.1 ± 3.4		61.9 ± 8.9		22.2 ± 3.3	
The ways to access (Multiple choice)							
Relatives/Friends	310 (62.9)	6.3 ± 3.7		60.5 ± 9.5		21.7 ± 3.3	
WeChat official account	57 (11.6)	7.1 ± 3.5		62.0 ± 8.4		22.4 ± 3.4	
Short video	39 (7.9)	7.1 ± 3.8		62.0 ± 9.5		21.2 ± 3.2	
Departmental bulletin boards	55 (11.2)	7.5 ± 3.3		63.1 ± 8.3		22.3 ± 3.0	
TV/Radio programs	51 (10.3)	7.8 ± 3.7		62.1 ± 9.2		22.0 ± 3.0	
No	244 (49.5)	4.6 ± 3.5		57.9 ± 9.6		21.3 ± 3.2	
Relationship with the patient			0.003		0.200		0.998
Parent	205 (41.6)	6.5 ± 3.6		60.7 ± 9.2		21.7 ± 3.2	
Grandparent	17 (3.4)	5.7 ± 3.9		57.9 ± 7.8		21.4 ± 3.5	
Children	27 (3.4)	4.4 ± 3.3		57.1 ± 7.8		21.6 ± 2.9	
Spouse	172 (34.9)	5.9 ± 3.5		60.0 ± 9.9		21.8 ± 3.5	
Other	71 (14.4)	4.7 ± 3.8		59.1 ± 9.8		21.8 ± 3.3	

Abbreviation: SD, standard deviation.

capita income of 2000–5000 RMB, followed by less than 2000 (33.9%) and 5000–10,000 (20.3%). The most common cancer diagnoses of their family members were lung cancer (20.7%), stomach cancer (16.2%), and bowel cancer (12.8%). More than half of the patients (participants' family members) received cancer consultation under Chinese Medicine or Integrated Chinese and Western Medicine (53.6%), and the rest received consultation through oncology departments (46.4%). Most patients had New Cooperative Medical insurance (64.7%), followed by basic medical insurance for urban employees (22.5%) and basic medical insurance for urban residents (11.8%). Around half of the patients had received Chinese Medicine services (51.1%). Among participants who had knowledge about Chinese Medicine (50.5%), most of them learned about it through relatives or friends (62.9%). The most common relationships between patients and participants were parents (41.6%) and spouses (34.9%).

Knowledge, Attitude, and Practice Toward the Treatment of Cancer Using Integrated Chinese-Western Medicine

This study found an average score of 5.87 ± 3.63 (possible range: 0–12) in participants' knowledge of cancer treatment using integrated Chinese-Western medicine (Table 1). The following knowledge question had the highest correct rate (Table 2): The purpose of cancer treatment in Chinese medicine is to maximize the quality of life and prolong the survival of cancer patients (69.4%). On the other hand, the false statement that "the diagnosis and treatment of cancer in

Table 2 Knowledge Dimension

Knowledge	N (%)	
	Correct	Wrong/Unclear
1. The cause of cancer is when the healthy qi is defeated by the exuberance of harmful qi (the dysfunction of the viscera, the abnormal movement of qi, blood, and body fluid).	251 (50.90)	242 (49.10)
2. The diagnosis and treatment of cancer in Chinese medicine are based on the patient's symptoms and signs, which vary from person to person, so the treatment for each patient must be completely different. (Wrong)	46 (9.30)	447 (90.70)
3. Chinese medicine is a major feature of cancer diagnosis and comprehensive cancer treatment in China.	338 (68.60)	155 (31.40)
4. Diagnosis and treatment in Chinese medicine mainly focus on replenishing the weak parts, strengthening the injured parts, and protecting the body before the disease has occurred.	285 (57.80)	208 (42.20)
5. The purpose of cancer treatment in Chinese medicine is to maximize the quality of life and prolong the survival of cancer patients.	342 (69.40)	151 (30.60)
6. When treating cancer with Chinese medicine, Western medical treatments such as radiotherapy and chemotherapy cannot be used at the same time. (Wrong)	164 (33.30)	329 (66.70)
7. Chinese medicine only offers treatments of medicine-decocted soup or Traditional Chinese medications. (Wrong)	178 (36.10)	315 (63.90)
8. As an auxiliary and symptomatic medicine, Chinese medicine can reduce the adverse reactions caused by surgery, radiotherapy, and chemotherapy, as well as improve the survival rate.	314 (63.70)	179 (36.30)
9. Traditional Chinese medicine therapy is flexible, effective, convenient, and safe in the prevention and treatment of malignant tumors.	263 (53.30)	230 (46.70)
10. Chinese medicine therapy, such as ear point pressing or ear point acupuncture, can relieve delayed vomiting and cancer pain after chemotherapy.	201 (40.80)	292 (59.20)
11. Chinese medicine therapy, such as compressing with Chinese herbs, is effective for cancer pain and post-chemotherapy gastrointestinal reactions.	245 (49.70)	248 (50.30)
12. Chinese herbal fumigation can tonify qi, invigorate blood, and warm and open the human body channels and collaterals, which can alleviate adverse reactions such as peripheral neurotoxicity caused by chemotherapy.	268 (54.40)	225 (45.60)

Chinese medicine are based on the patient's symptoms and signs, which vary from person to person, so the treatment for each patient must be completely different" had the lowest correct rate (9.3%).

Female participants (p=0.033), those aged 18–48 (p=0.008), those who lived in urban areas (p<0.001), those who attended junior college or above (p<0.001), those who are employed (p<0.001), those with a monthly income of 10,000–20,000 (p<0.001), those with family member consulting Chinese medicine or integrative Chinese-Western medicine (p<0.001), those with their family member receiving Chinese medicine treatment (p<0.001), those who had knowledge of Chinese medicine (p<0.001), and those who were children of the cancer patients (p=0.003) tended to have higher scores in the knowledge dimension (Table 1).

It was found that the attitude dimension had an average score of 59.90 ± 9.45 (possible range: 16–80), and the practice dimension had an average score of 21.73 ± 3.27 (possible range: 6–30) (Table 1). Overall, most participants rated positively or very positively on the attitude items, and most participants rated from strongly agree to neutral for the practice items (Table 3). The most positive item was A5 ("I think integrated Chinese and Western medicine therapy can improve my family's physical condition more effectively than using Western medicine alone"). The most negative item was A3 ("I think the theories and terminology of Chinese medicine are difficult to understand"). The most proactive practice item was P4 ("I will recommend my family's patients to choose integrated traditional Chinese and western medicine treatment"), while the least proactive one was P2 ("When I am feeling unwell (but non-acute and severe), I will give priority to undergoing Chinese medicine").

Younger participants (p=0.036), those who attended junior college or above (p=0.027), those who were self-employed (p=0.019), those with a monthly income of 10,000–20,000 (p=0.020), those with family member consulting Chinese medicine or integrative Chinese-Western medicine (p<0.001), those with family member receiving Chinese medicine treatment (P<0.001), and those who had knowledge of Chinese medicine (p<0.001) were more likely to have higher attitude scores (Table 1). Participants who were homemakers (p=0.045), those with family members consulting Chinese medicine or integrative Chinese-Western medicine (p<0.001), those with family members receiving Chinese medicine treatment (p=0.003), and those who had knowledge of Chinese medicine (p=0.004) were more likely to have higher practice scores.

Table 3 The Score Distribution of "Attitude" and "Practice" Dimensions

Attitude	**Strongly Agree/Very Useful**	**Agree/Useful**	**Neutral**	**Disagree/ Basically Useless**	**Strongly Disagree/ Totally Useless**
1. I think applying integrated Chinese and Western medicine therapy to my family gives me peace of mind. (P)	141 (28.60)	224 (45.40)	109 (22.10)	16 (3.20)	3 (0.60)
2. I think Chinese medicine is unscientific. (N)	18 (3.70)	45 (9.10)	59 (12.0)	238 (48.30)	132 (26.80)
3. I think the theories and terminology of Chinese medicine are difficult to understand. (N)	45 (9.10)	151 (30.60)	190 (38.50)	81 (16.40)	26 (5.30)
4. I think Chinese medicine therapy can achieve "one person, one prescription" for everyone. (P)	80 (16.20)	246 (49.90)	135 (27.40)	29 (5.90)	3 (0.60)
5. I think integrated Chinese and Western medicine therapy can improve my family's physical condition more effectively than using Western medicine alone. (P)	127 (25.80)	242 (49.10)	109 (22.10)	12 (2.40)	3 (0.60)
6. I am full of confidence in integrated Chinese and Western medicine therapy. (P)	126 (25.60)	234 (47.50)	125 (25.40)	7 (1.40)	1 (0.20)
7. I want to know more about Chinese medicine therapy. (P)	113 (22.90)	262 (53.10)	108 (21.90)	7 (1.40)	3 (0.60)
8. In which aspect do you think the addition of Chinese medicine has improved your family:					
8.1 Relieve pain (P)	120 (24.30)	153 (31.0)	181 (36.70)	32 (6.50)	7 (1.40)
8.2 Improve cancer-related fatigue (P)	99 (20.10)	176 (35.70)	183 (37.10)	27 (5.50)	8 (1.60)
8.3 Reduced toxicity and increased effectiveness of Radiotherapy and Chemotherapy (P)	111 (22.50)	176 (35.70)	179 (36.30)	18 (3.70)	9 (1.80)
8.4 Improve the quality of life (P)	120 (24.30)	167 (33.90)	176 (35.70)	22 (4.50)	8 (1.60)
8.5 Improve immunity (P)	112 (22.70)	186 (37.70)	170 (34.50)	21 (4.30)	4 (0.80)
8.6 Prolong survival (P)	106 (21.50)	178 (36.10)	182 (36.90)	20 (4.10)	7 (1.40)
8.7 Anti-recurrence and metastasis (P)	88 (17.80)	142 (28.80)	212 (43.00)	39 (7.90)	12 (2.40)
8.8 Improve psychological and mental state (P)	125 (25.40)	172 (34.90)	171 (34.70)	18 (3.70)	7 (1.40)
9. How much do you approve of the treatment of tumors with integrated Chinese and Western medicine? (P)	133 (27.0)	223 (45.20)	128 (26.00)	9 (1.80)	-
Practice	**Strongly Agree/Support**	**Agree/Support**	**Neutral**	**Disagree/ Oppose**	**Strongly Disagree/ Oppose**
1. I am more supportive of my family to choose integrated d Western and Chinese medicine than to choose Western medicine treatments only. (P)	151 (30.60)	234 (47.50)	89 (18.10)	16 (3.20)	3 (0.60)
2. When I feel unwell (but non-acute and severe), I will give priority to undergoing Chinese medicine. (P)	65 (13.20)	151 (30.60)	184 (37.30)	80 (16.20)	13 (2.60)
3. I will strictly supervise my family to take medicine, recuperate, and avoid unhealthy food according to the requirements of Chinese medicine. (P)	133 (27.0)	249 (50.50)	92 (18.70)	16 (3.20)	3 (0.60)
4. I will recommend my family's patients choose integrated traditional Chinese and Western medicine treatment. (P)	145 (29.40)	207 (42.00)	128 (26.00)	12 (2.40)	1 (0.20)
5. I do not want my family to choose integrated Chinese and Western medicine therapy even if the doctor recommends it. (N)	22 (4.50)	82 (16.60)	104 (21.10)	201 (40.80)	84 (17.0)
6. Your willingness to the decisions made by your family about the application of the following therapies is: (P)					
6.1 Medicine-decocted soup (efficacy: benefiting qi, strengthening body resistance, resisting tumors, and regulating body constitution)	136 (27.60)	228 (46.20)	112 (22.70)	15 (3.00)	2 (0.40)
6.2 Chinese patent drug (granules) (efficacy: benefiting qi, strengthening body resistance, resisting tumor and conditioning constitution)	131 (26.60)	237 (48.10)	111 (22.50)	13 (2.60)	1 (0.20)
6.3 Acupuncture (efficacy: strengthening physical fitness, keeping health, relieving local pain, relieving abdominal pain and distension, promoting intestinal peristalsis, etc.)	111 (22.50)	212 (43.00)	149 (30.20)	19 (3.90)	2 (0.40)

(*Continued*)

Table 3 (Continued).

Practice	Strongly Agree/Support	Agree/Support	Neutral	Disagree/ Oppose	Strongly Disagree/ Oppose
6.4 Moxibustion (efficacy: enhancing the efficacy of radiotherapy and chemotherapy, promoting the circulation of qi and blood, dispersing nodules and reducing swelling, strengthening physical fitness, keeping health, relieving local pain, relieving abdominal pain and distension, promoting intestinal peristalsis, etc.)	131 (26.60)	232 (47.10)	113 (22.90)	15 (3.00)	2 (0.40)
6.5 Ear acupoint stimulation (efficacy: preventing and alleviating chemotherapy-induced vomiting and relieving cancerous pain)	75 (15.20)	241 (48.90)	154 (31.20)	21 (4.30)	2 (0.40)
6.6 Compress of traditional Chinese medicine (efficacy: dispersing nodules and reducing swelling, strengthening physical fitness, keeping health, relieving asthma, relieving local pain, relieving abdominal pain and distension, promoting intestinal peristalsis, etc.)	123 (24.90)	227 (46.00)	131 (26.60)	10 (2.00)	2 (0.40)
6.7 Sitting bath (efficacy: clearing local inflammation, repairing local trauma, relieving stress, promoting blood circulation and removing blood stasis, moistening intestines, and expelling toxins)	88 (17.80)	226 (45.80)	155 (31.40)	20 (4.10)	4 (0.80)
6.8 Chinese herbal fumigation and washing (efficacy: promoting blood circulation and expelling pus, cooling blood and reducing swelling, regulating qi and blood, clearing away heat and detoxifying; Suitable for all kinds of diseases)	114 (23.10)	219 (44.40)	142 (28.80)	14 (2.80)	4 (0.80)
6.9 enema with traditional Chinese medicine/rectal drip (efficacy: faster absorption of drugs by the intestines, without damaging gastric mucosa, laxative, etc.)	79 (16.00)	218 (44.20)	167 (33.90)	26 (5.30)	3 (0.60)
6.10 Acupoint injection (efficacy: strengthening physical fitness, relieving pain, and having different degrees of regulatory effects on the respiratory and urinary systems).	91 (18.50)	210 (42.60)	162 (32.90)	24 (4.90)	6 (1.20)

Correlation Analysis

There was a significant positive correlation between knowledge-attitude (r=0.446, p<0.001), knowledge-practice (r=0.321, p<0.001), and attitude-practice (r=0.623, p<0.001; Table 4).

Factors Associated with Knowledge, Attitude, and Practice Toward the Treatment of Cancer Using Integrated Chinese-Western Medicine

Multivariate logistic regression results showed that junior college and above (OR=2.87, 95% CI: 1.41–5.88, P=0.004), patient consulted in TCM/Integrative Medicine Department (OR=1.94, 95% CI: 1.17–3.24, P=0.011), and possessing knowledge of TCM (OR=2.90, 95% CI: 1.76–4.79, P<0.001) were independently associated with good knowledge (Figure 1A and Table S1). Knowledge (OR=1.96, 95% CI: 1.23–3.11, P=0.005), the patient consulted in TCM/Integrative Medicine Department (OR=2.10, 95% CI: 1.27–3.47, P=0.004) were independently associated with a positive attitude (Figure 1B and Table S1). Attitude (OR=5.65, 95% CI: 3.57–8.93, P<0.001) was independently associated with positive practice (Figure 1C and Table S1).

Table 4 Pearson's Correlation Analysis

	Pearson Correlation		
	Knowledge	Attitude	Practice
Knowledge	1		
Attitude	r=0.446 (P<0.001)	1	
Practice	r=0.321 (P<0.001)	r=0.623 (P<0.001)	1

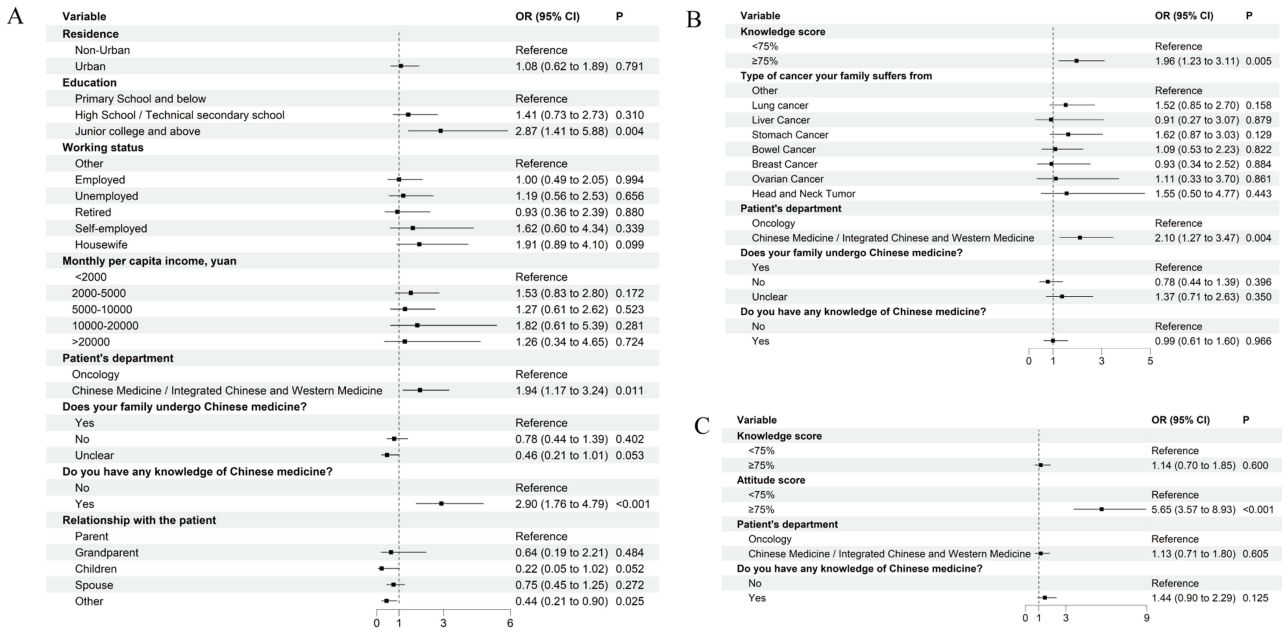

Figure 1 Multivariate logistic regression analysis for (**A**) knowledge, (**B**) attitude, and (**C**) practice.

Discussion

TCM is very common in China, and its use is increasing worldwide.[11,37,38] The possible reasons for its increased use include 1) the recognized effects of TCM, 2) TCM is an alternative treatment with fewer adverse effects, 3) personal preferences and beliefs, and 4) advertising marketing.[11,37,38] In shared decision-making, physicians should provide the best treatment strategies based on evidence-based medicine, and the optimal decision takes into account evidence-based information about available options, the provider's knowledge and experience, and the patient's values and preferences.[39,40] Although the reasons for selecting TCM in the present study were not investigated, identifying the factors influencing the use of TCM, including integrated Western medicine-TCM, is clinically significant. The most important thing about whether to use TCM for cancer treatment is still how effective it is and what role it can play in different stages of cancer treatment. For patients and their family members, the knowledge of Western medicine is also very limited. In general, patients and their family members will not refuse to receive Western medical treatment, even if they have lower education or lower knowledge of Western medicine.

This large-scale survey study found that there was inadequate knowledge of integrative Chinese-Western medicine in cancer care among family members of Chinese cancer patients. Overall, most family members had positive attitudes and practices of integrative Chinese-Western medicine. Our study also identified important factors associated with the KAP levels, which are valuable in identifying individuals requiring further education and support. Around half of the cancer patients sought TCM in their cancer treatment, which is the same as previous studies in the Chinese populations (57–83%).[41,42]

The average knowledge score is 5.9 out of 12, reflecting an unsatisfactory level of knowledge of integrative Chinese-Western medicine among participants. Most participants understood that TCM is an integral part of cancer management in China and TCM can improve cancer patients' quality of life and survival. Yet, some participants had the misconception that TCM treatment has to be completely different for each individual and TCM only includes drug therapies. The lack of knowledge among family members is not surprising. A recent study has shown that treatment-related information, especially information regarding TCM, was the most frequently reported unmet information need for both cancer patients and their caregivers.[43] The knowledge of TCM is not well-provided by oncologists; therefore, it is critical for healthcare professionals to fulfill this unmet information need to allow the families to make informed and educated treatment decisions.[25,44] The factors associated with poorer knowledge of integrative Chinese-Western medicine in treating cancer

were having a lower education level, receiving services under the oncology department, and not having self-perceived knowledge of TCM. Yu et al have also identified a significant association between education and knowledge of TCM.[25]

Overall, most participants responded "very positive" to "positive" to questions on the attitude dimension. This finding is consistent with previous qualitative studies in Chinese cancer patients. Lam et al reported that over two-thirds of cancer patients believed that integrative Chinese-Western medicine was effective.[41] Cancer patients believe that TCM is a complementary resource to conventional Western medicine by reducing the adverse effects of chemotherapy, regaining their energy (Qi), and even improving their moods.[45,46] Similar to Chinese cancer patients, their family members also have a positive attitude toward integrative Chinese-Western medicine. Families of breast cancer patients believed that TCM provided a more holistic approach to overcoming the disease.[46] In addition, our study found that the level of knowledge was an important factor in influencing people's attitudes toward integrative medicine for cancer treatment, confirming that adequate knowledge can lead to positive attitudes.[47]

The average practice score is 21.7 out of 30. The majority of the participants would recommend that their family member (ie, the cancer patient) receive integrative Chinese-Western medicine. Additionally, most participants rated Strongly Agree to Neutral for their willingness for the patient to receive a variety of TCM cancer treatments, including medicine-decocted soup, Chinese patent drugs, acupuncture, moxibustion, ear acupoint simulation, compress of TCM, sitting bath, Chinese herbal fumigation and washing, enema with TCM, and acupoint injection. McQuade et al reported that the most used TCM among cancer patients was Chinese herbal medicine.[42] In this study, the participants also demonstrated stronger support for using herbal medicine compared to less conventional TCM therapies, such as enema with TCM. Our study also found that attitude was significantly associated with practice scores, which is consistent with previous findings. A recent study on KAP of complementary and alternative medicine among cancer patients also found a statistically significant relationship between their attitude and the practice of complementary and alternative medicine.[48]

The present study highlights the importance of education on integrative Chinese-Western medicine in the treatment of cancer among family members of cancer patients. The present study was cross-sectional, and causality cannot be determined. Nevertheless, the major role of KAP studies is to identify gaps, misconceptions, and misunderstandings that constitute barriers to the optimal implementation of a given health practice. Interventions can then be designed based on the results. Effective educational materials and programs are needed to improve the knowledge of family members and the quality of cancer care. In addition, family members with lower education levels, lower perceived knowledge of TCM, and those not receiving TCM or integrative Chinese-Western medicine consultations should be prioritized, as these individuals tend to have poorer knowledge. Targeted educational materials and programs should be designed to improve individuals' knowledge of the subject, prioritizing those with less knowledge. KAP interventions have been shown to improve the care of cancer patients.[49–51] The barriers to proper practice could include healthcare infrastructure, cost, or resistance from some physicians believing more in Western medicine. The barriers were not assessed in the present study, but future studies will examine them. Nevertheless, the long-term benefits of improving caregiver KAP could include reduced healthcare disparities and improved patient quality of life. Those impacts will also have to be investigated. Longitudinal studies to assess changes in KAP over time would also enrich the understanding of the caregiver's KAP.

There are several limitations to this study. First, this study was only conducted in selected hospitals in China, and the results might not be generalizable on a global scale, especially in countries where TCM is not widely provided. TCM is mostly exclusively used in China and in Chinese communities abroad, limiting generalizability. Nevertheless, the study could encourage investigators from other parts of the world to examine the KAP toward the integrated use of modern and traditional medicine. In addition, KAP studies and their questionnaires are designed by local investigators according to the local practice, reality, and policies, limiting generalizability. The questionnaire did not undergo a formal validation process, but it was revised and commented on by four independent experts and underwent a small pre-test that revealed a Cronbach's α of 0.8941. Second, due to the self-reported nature of the study, the result may deviate from the actual situation. Third, most participants provided positive answers in the attitude and practice dimensions, and the results might be affected by the social desirability bias. On the other hand, the social desirability bias requires the participants to know what the "right answers" are. Considering that the participants had poor

knowledge scores, the risk of the social desirability bias is low. Fourth, the present study focused on caregivers and family members. Future studies will include the patients themselves to identify their gaps in knowledge and design educative interventions. Fifth, this study only evaluated the KAP of the family members, not the barriers encountered when attempting to apply practice.

Conclusions

In conclusion, families of cancer patients have poor knowledge and moderate attitudes and practices toward integrative Chinese-Western medicine in cancer treatment. Higher education levels, better knowledge of TCM, and attending Chinese Medicine/Integrated Chinese and Western Medicine departments were associated with good practice, positive attitudes, and positive TCM practices. Developing effective educational resources and programs to improve knowledge and attitudes towards integrative medicine is crucial to empower family members to make informed decisions and provide better support to their loved ones throughout the cancer treatment process. Future studies will examine the KAP of the patients to integrate them into future education interventions. Although research would be necessary, the present study could provide hints regarding the combination of modern and traditional medicine in other countries.

Data Sharing Statement

All data generated or analyzed during this study are included in this published article.

Ethics Approval and Consent to Participate

This study was ethically approved by the Clinical Medical Research Ethics Committee of the First Affiliated Hospital of Anhui Medical University (Quick-PJ 2023-04-37), and written informed consent was obtained from all participants.

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 declare that they have no competing interests in this work.

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