original report

Do Perceived Needs Affect Willingness to Use Traditional Chinese Medicine for Survivorship Care Among Chinese Cancer Survivors? A Cross-Sectional Survey

abstract

Purpose We aimed to quantify Chinese cancer survivors' perceived needs for survivorship care and to evaluate whether these needs could impact their willingness to use traditional Chinese medicine (TCM).

Methods We conducted a cross-sectional survey with members of the Beijing Anti-Cancer Association in China. We measured perceived needs with the seven-item Brief Chinese Cancer Survivorship Needs Scale that assesses psychological, functional, nutritional, social, body image, pain, and symptom needs. The outcome variable was willingness to use TCM for survivorship care. We performed multivariable logistic regression analyses to evaluate whether perceived needs are associated with willingness.

Results A total of 600 patients were invited, with a response rate of 81%. The mean (standard deviation) score of the perceived needs scale (0 to 10) was 4.4 (2.2), with the majority of participants endorsing nutritional (72%), symptom (65%), and psychological (54%) needs. Among survivors, 387 (80%; 95% CI, 76% to 83%) were willing to use TCM for survivorship care. In multivariable analysis, a higher perceived needs score (adjusted odds ratio [OR], 1.33; 95% CI, 1.14 to 1.56; $P < .001$) was associated with greater willingness to use TCM. Specifically, nutritional (OR, 3.17; 95% CI, 1.79 to 5.62; $P < .001$) and symptom needs (OR, 3.15; 95% CI, 1.79 to 5.55; $P < .001$) had the strongest relationship.

Conclusion A higher level of perceived needs, especially in the areas of nutrition and symptoms, was associated with greater willingness to use TCM for survivorship care.

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INTRODUCTION

Cancer survivorship care is an emerging field in China. In 2015, it was estimated that there would be 4.29 million new patients with cancer in China, with the incidence expected to rise.[1] At the same time, the mortality rates for those with major cancers have declined in recent years because of earlier cancer diagnoses and advances in treatment.[2] As a result, more patients with cancer can expect long-term survival after diagnosis.[3] Because they will continue to experience physical and psychosocial problems after active treatments, this rapidly expanding population of cancer survivors will have increasing needs for healthcare services.[1,4,5] In developed countries such as the United States, survivorship care has already become a distinct part of the cancer care system.[6] However in China, survivorship care has not been fully accepted as standard care for cancer survivors.

Because of its unique historical and cultural context, traditional Chinese medicine (TCM) could play an important role in cancer survivorship care in China. TCM is a significant component of the standard health-service delivery system in China, and it is one of the most extensively used services among Chinese patients with cancer during cancer treatment.[7,8] McQuade et al[9] found that > 80% of Chinese patients with cancer who were undergoing active treatment had used TCM therapy since their cancer diagnosis.[9] Furthermore, TCM and survivorship care share similar goals of helping cancer survivors prevent cancer recurrence, enhance quality of life, and prolong life.[7,9,10] Therefore, a comprehensive, integrative TCM survivorship care model would be practical for and accepted by Chinese cancer survivors.

To develop such a model, it is necessary to understand cancer survivors' perceived needs, which are a critical component of patient-centered survivorship

care, including cancer surveillance, as well as psychological and physical support.[11] After two decades of effort, investigators from many countries have found that the majority of cancer survivors face many new needs that are unmet after completing their active cancer treatments.[12-14] However, to date, the perceived needs among mainland Chinese cancer survivors are largely unknown. A few qualitative studies with small sample sizes have begun to shed light on this area.[15,16] Quantifying perceived needs is part of an essential process to outline the impact of the cancer experience in this population after the completion of active treatments.[17,18]

Studies have demonstrated that cancer survivors' needs are important factors in their decision to use complementary and alternative medicine (CAM).[19,20] Mao et al[21] found that cancer survivors with more unmet survivorship care needs were more likely to use CAM. TCM is one of the two main medical practices in the Chinese healthcare system and is regarded as a part of CAM in most western countries.[22] To the best of our knowledge, no prior study has investigated whether Chinese cancer survivors' perceived needs could impact their willingness to use TCM during the survivorship care phase in China. However, this knowledge is essential to build an integrative TCM survivorship care model targeted to meet Chinese cancer survivors' needs.

By integrating TCM into a patient-centered comprehensive survivorship care model, we can provide better survivorship care services to more Chinese cancer survivors and help meet their needs. Therefore, our study aimed to investigate Chinese cancer survivors' perceived needs and their willingness to use TCM for survivorship care. We hypothesized that higher levels of perceived needs would be associated with more willingness to use TCM in survivorship. In addition, we hypothesized that specific types of needs would be associated with willingness to use TCM for survivorship care.

METHODS

Sample

We recruited a convenience sample of cancer survivors from the Beijing Anti-Cancer Association between September 2015 and November 2015. Established in 1990, the Beijing Anti-Cancer Association is a nonprofit self-support group exclusively for patients with cancer in Beijing, China; it has 20 subgroups and $>$ 50,000 registered members.[23] Eligible participants were age $\geqslant$ 18 years, had a primary diagnosis of cancer, and a Karnofsky performance score of $>$ 60. Additional inclusion criteria stipulated the patient's ability to understand and provide informed consent in Chinese. The investigator (L.S.) approached the leaders of 20 subgroups in the Beijing Anti-Cancer Association and explained the study aim and methods to ensure that all the leaders understood the intention of the survey. Then the leaders helped recruit their members to fill out the paper-based questionnaire. Informed consent on the top of the questionnaire was presented for all individual participants included in this study; because we did not collect any identifying information, participants were not required to sign consent as part of this survey study. Each participant completed a 20-minute self-report survey. The Institutional and Ethics Review Board of Xiyuan Hospital, China Academy of Chinese Medical Sciences, approved the study protocol.

Data Collection

The primary predictors were cancer survivors' perceived needs for survivorship care. To map out the broadest categories of needs during the design phase of the study, we reviewed the literature and talked with oncologists and patient advocates.[24] We then developed the Brief Chinese Cancer Survivorship Needs Scale (seven items) with the question, "Currently, do you have the following needs after active cancer treatments (psychological/ functional/ nutritional/ social/ body image/ pain/ symptom)?" We scored the degree of perceived needs toward cancer survivorship on a four-point Likert scale (1 = no need, 2 = a little need, 3 = moderate need, 4 = high need). We then calculated the scores by summing the seven individual items and normalizing them to a value between 0 and 10. Higher scores indicated greater perceived needs. We identified that the score of the seven-item perceived needs scale had an acceptable internal consistency (Cronbach's α coefficient) of 0.90 and consisted of one domain with an eigenvalue of 4.90. None of the seven items showed ceiling or floor effects. In addition, to ease interpretation of each specific type of perceived need, we dichotomized the outcome with those who reported "moderate need" and "high need" as having the specific need.

The primary outcome was cancer survivors' willingness to use TCM for survivorship care. Using a four-point Likert scale (1 = very unwilling to use, 2 = unwilling to use, 3 = willing to use, 4 = very willing to use), we asked participants to indicate if they would be willing to use TCM during survivorship care. To ease interpretation, we dichotomized

the outcome with those who reported "willing to use" and "very willing to use" as willing to use TCM.

We obtained demographic factors, including age, sex, education level, monthly income (in Chinese currency, RMB), and employment status through patient self-report. We also obtained clinical factors, including type of cancer, stage, and diagnostic history, through patient self-report. We dichotomized cancer stage into localized (stage I to III) or metastatic (stage IV) disease at the time of survey.

Statistical Analyses

We present descriptive data of participants' sex, age, employment status, cancer type, time since cancer diagnosis, cancer staging, willingness to use TCM, perceived needs score, and specific perceived needs. For categorized data, we present the numbers and proportion of each group. We calculated the mean and standard deviation for continuous data such as age, time since cancer diagnosis, and perceived needs score. We then used a two-sample *t* test to determine whether the perceived needs score differed on the basis of patient characteristics and willingness to use TCM. Univariate linear regression was used to test for the association between type of cancer and perceived needs score. We also used Fisher's exact test to determine if there were an association between perceived needs (yes/no), patient characteristics, and willingness to use TCM. We used univariate logistic regression analyses to assess the association between specific types of perceived needs and willingness to use TCM. We also used multivariable logistic regression models to determine whether perceived needs score or types of specific needs were associated with willingness to use TCM when controlling for patient characteristics that also correlated with such willingness in univariate regression models. The area under receiver operating characteristic curve (AUC) of the models was calculated for comparison between the models. All analyses with a two-sided test and a P value $< .05$ were considered significant. Analyses were performed using Stata 13 (StataCorp, College Station, TX).

RESULTS

Background Characteristics of Participants

Of the 600 patients we approached, 540 agreed to participate. Among the 60 survivors who declined to participate (10%), the main reasons were lack of time (n = 25; 42%) and unwillingness to take the survey (n = 35; 58%). In addition, 56 survivors were excluded because of incomplete primary outcome data. This led to the final sample size of 484 patients. This population reflected a response rate of 81% among eligible subjects.

The mean age of survey participants was 59 years (standard deviation [SD], 9 years; range, 23 to 88 years). Other patient characteristics are reported in Table 1. Major disease groups were breast cancer (48%), lung cancer (13%), and gynecologic cancer (12%); 9% of patients had metastatic disease. Patients who had been diagnosed with cancer < 5 years ago made up 39% of the sample (Table 1).

Perceived Needs Toward Survivorship Care

Among all participants, the mean score for the perceived needs scale was 4.4 out of a possible 10 (SD, 2.2). In addition, 73% of the survivors had specific perceived needs for nutrition, 65% had symptom needs, and 55% had psychological needs. At the same time, < 50% of survivors had function (45%), pain (43%), body image (40%), and social needs (37%; Fig 1). On average, each participant reported four different types of needs (SD, 2). Among them, 17% had no needs at all, 38% had one to three different needs, and 45% had four or more different types of needs.

Participants who had at least a college education had higher perceived needs scores than those who had a high school or lower education level (4.7 *v* 4.3; difference in means, 0.4; 95% CI, 0.03 to 0.8; $P = .037$). In addition, the perceived needs score was significantly higher among participants who were still working at the time of the survey than among retired or unemployed participants (5.3 *v* 4.4; difference in means, 0.9; 95% CI, 0.1 to 1.7; $P = .022$; Table 1).

Willingness to Use TCM for Survivorship Care

Most participants were willing to use TCM for cancer survivorship care (n = 387 [80%]; 95% CI 76%–83%). Cancer survivors who were willing to use TCM had a significantly higher perceived needs score than those who were not willing to use TCM for survivorship (4.6 *v* 3.7; difference in means, 0.9; 95% CI, 0.4 to 1.4; $P < .001$; Table 1). Patients who had been diagnosed with cancer < 5 years ago were more likely to use TCM than long-term cancer survivors, who were defined as those who had been diagnosed ⩾ 5 years ago (88% *v* 74%; difference in proportions, 14%; 95% CI, 7% to 21%; $P < .001$). Survivors who had at least a college education were more willing to use TCM than survivors with less education (85% *v* 77%; difference in proportions, 8%; 95% CI, 0.9% to 15%; $P = .033$; Table 1).

Table 1. Patient Characteristics and Perceived Needs Score for Survivorship Care

Characteristic*	Total No. (%)	Perceived Needs Score (0-10)†			Willing to Use TCM‡	
		Mean	SD	*P*§	No. (%)	*P*§
Total	484 (100)	4.4	2.2	—	387 (80)	—
Sex						
Female	403 (83)	4.5	2.2		319 (79)	
Male	81 (17)	4.4	2.2	.9	68 (84)	.4
Age, years						
⩽ 60	271 (58)	4.7	2.3		218 (80)	
> 60	196 (42)	4.2	2.0	.035	154 (79)	.6
Monthly income, RMB						
⩽ 5,000	247 (53)	4.3	2.0		190 (77)	
> 5,000	220 (47)	4.6	2.3	.2	184 (84)	.082
Education						
High school or less	274 (60)	4.3	2.2		210 (77)	
College or above	184 (40)	4.7	2.1	.037	156 (85)	.043
Employment						
Unemployed and retired	387 (92)	4.4	2.2		307 (79)	
Working	33 (7.9)	5.3	2.2	.022	30 (91)	.2
Tumor site						
Breast	225 (48)	4.4	2.3		173 (77)	
Lung	60 (13)	4.9	2.4		53 (88)	
Colorectal	41 (8.7)	4.1	1.8		33 (80)	
Gynecologic	56 (12)	4.0	1.6		44 (79)	
Other	91(19)	4.6	2.2	.2	74 (81)	.4
Time since diagnosis, years						
< 5	174 (39)	4.6	2.3		153 (88)	
⩾ 5	277 (61)	4.3	2.1	.10	206 (74)	< .001
TNM stage						
I-III	361 (91)	4.5	2.1		288 (80)	
IV	34 (9)	4.9	2.5	.3	27 (79)	.9
Willingness to use TCM						
Yes	387 (80)	4.6	2.3		—	—
No	97 (20)	3.7	1.7	< .001	—	—

Abbreviations: —, not applicable; SD, standard deviation; TCM, traditional Chinese medicine.

*Some data are missing for some participants' characteristics.

†For perceived needs score, *t* test was used to compared the mean differences between groups. Univariate linear regression was used to compare perceived needs score between tumor sites.

‡For willingness to use TCM, Fisher's exact test was used.

§Statistical significance was set at $P < .05$.

Relationship Between Participants' Characteristics, Perceived Needs Score, and Willingness to Use TCM

We created a multivariable logistic regression model to evaluate the association between patient socioeconomic and disease factors and willingness to use TCM. In this model, survivors with higher education levels were more willing to use TCM (adjusted odds ratio [OR], 1.84; 95% CI, 1.02 to 3.31; $P = .043$), whereas long-term survivors (diagnosed ⩾ 5 years ago) were less willing to use TCM (OR, 0.53; 95% CI, 0.28 to 1.00; $P = .049$; Table 2). The AUC of this model was 0.64.When we incorporated the perceived needs score into the model, education level no longer reached statistical significance. A one-point increase in

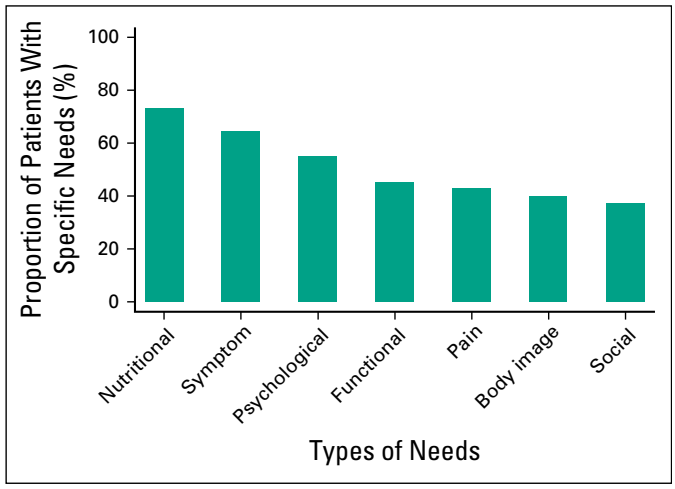

Fig 1. Proportion of survivors with specific perceived needs.

the perceived needs score was associated with a 33% increase in the odds of willingness to use TCM (OR, 1.33; 95% CI, 1.14 to 1.56; $P < .001$). The AUC of the model incorporating the perceived needs score was 0.71, indicating that this model is better at identifying patients who are willing to use TCM for survivorship care (Table 2).

Relationship Between Specific Perceived Needs and Willingness to Use TCM

In univariate analysis, survivors who had nutritional, symptom, and functional needs were more likely to use TCM for survivorship care ($P < .05$ for all). When controlling for sex, age, education level, time since cancer diagnosis, and staging, we found that nutritional, symptom, functional, psychological, pain, and body image needs were associated with more willingness to use TCM ($P < .05$ for all). Among them, nutritional needs (OR, 3.17; 95% CI, 1.79 to 5.62; $P < .001$) and symptom needs (OR, 3.15; 95% CI, 1.79 to 5.55; $P < .001$) had the largest association with such willingness (Table 3).

DISCUSSION

Cancer survivorship is quickly becoming an important and pressing public health issue in China because of the increasing incidence of cancer secondary to population aging and to drastic life style changes, and increases in survival as a result of early diagnosis and improved treatment. To our knowledge, this is the first study to report mainland Chinese cancer survivors' perceived needs and

Table 2. Factors Related to Willingness to Use Traditional Chinese Medicine: Multivariable Logistic Regression Models

	Model 1*			Model 2†		
Factor	**OR**	**95% CI**	***P*‡**	**OR**	**95% CI**	***P*‡**
Perceived needs score						
Continuous score, 0-10	—	—	—	1.33	1.14 to 1.56	< .001
Sex						
Male	1.00	—	—	1.00	—	—
Female	0.58	0.23 to 1.48	.3	0.64	0.25 to 1.67	.4
Age, years						
⩽ 60	1.00	—	—	1.00	—	—
> 60	0.89	0.51 to 1.53	.7	0.92	0.52 to 1.61	.8
Education						
High school or less	1.00	—	—	1.00	—	—
College or above	1.84	1.02 to 3.31	.043	1.69	0.93 to 3.09	.087
Time since cancer diagnosis, years						
< 5	1.00	—	—	1.00	—	—
⩾ 5	0.53	0.28 to 1.00	.049	0.53	0.28 to 1.02	.057
TNM stage						
I-III	1.00	—	—	1.00	—	—
IV	0.90	0.34 to 2.39	.8	0.82	0.30 to 2.23	.7
Area under ROC curve			.64			.71

Abbreviations: —, not applicable; OR, odds ratio; ROC, receiver operating characteristic.
*Model 1 included demographic and clinical factors.
†Model 2 included perceived needs in addition to the demographic and clinical factors.
‡Statistical significance was set at $P < .05$.

Table 3. Relationship Between Specific Perceived Needs and Willingness to Use Traditional Chinese Medicine

	Univariate Analyses			Multivariable Analyses*		
Specific Need	OR	95% CI	P†	OR	95% CI	P†
Nutritional	2.33	1.45 to 3.75	< .001	3.17	1.79 to 5.62	< .001
Symptom	2.35	1.48 to 3.73	< .001	3.15	1.79 to 5.55	< .001
Psychological	1.52	0.97 to 2.40	.070	1.89	1.09 to 3.28	.023
Functional	1.87	1.15 to 3.04	.011	1.91	1.08 to 3.39	.027
Pain	1.53	0.95 to 2.47	.079	1.87	1.05 to 3.32	.033
Body image	1.61	0.99 to 2.65	.057	1.89	1.04 to 3.45	.037
Social	1.52	0.92 to 2.50	.097	1.39	0.76 to 2.57	.3

NOTE. Specific need compared to patients who did not have the specific need.

Abbreviation: OR, odds ratio.

*All multivariable analyses were adjusted by sex, age, education, time since cancer diagnosis, and cancer staging.

†Statistical significance was set at $P < .05$.

willingness to use TCM for survivorship care. In our study, > 80% of Chinese cancer survivors reported perceived needs after active cancer treatments, demonstrating a substantial demand for incorporating TCM into survivorship care. We also found that perceived needs, especially nutritional and symptom needs, were strongly associated with Chinese cancer survivors' willingness to use TCM. These results indicate the importance of exploring the integration of TCM into the survivorship care model to meet Chinese cancer survivors' unique needs.

Generally, our results were consistent with previous findings on cancer survivors' perceived needs. Cancer survivors in many countries around the world have the same groups of perceived needs, although they may prioritize these needs differently.[25-30] Among mainland Chinese cancer survivors, nutritional needs were the most reported perceived need, followed by symptom, psychological, and functional needs. Cancer survivors from western countries such as the United States and United Kingdom have more psychological needs than physical and symptom needs.[12,31] However, similar to our findings in mainland Chinese cancer survivors, studies from Asian countries such as South Korea and Japan indicate that diet and nutritional needs are important among cancer survivors.[32,33] Such differences among countries may be due to cultural differences in perception of cancer and health.

In our study, most Chinese cancer survivors (80%) were willing to use TCM for cancer survivorship care. This indicates that Chinese cancer survivors would be open to integrating TCM into the survivorship care model in China. In the United States, there are several survivorship care models, including a nurse-led model, a shared-care model, and a survivorship clinic model.[34-36] However, China still lacks a mature survivorship care model. To shape such a model in China, it is necessary not only to import an existing survivorship care model but also to understand Chinese cancer survivors' cultural perspective and adapt the survivorship care model to meet the needs of Chinese cancer survivors. Our findings underscore the importance of including TCM in a survivorship care model for Chinese survivors.

Perceived nutritional needs and symptom needs were found to have the strongest association with Chinese cancer survivors' willingness to use TCM. Emerging evidence has shown that acupuncture and tai chi are effective for cancer survivors in controlling symptoms such as hot flashes, chronic pain, and fatigue.[10,37-39] Although most Chinese cancer survivors received Chinese herbal medicine (CHM) as TCM treatment during survivorship, the evidence of CHM for symptom control is still insufficient.[40-42] Similarly, although cancer survivors have high interest and use of dietary supplements,[43,44] there is limited evidence of CHM or diet therapy for cancer survivors.[45,46] Thus, we need to develop more studies to evaluate the potential role of TCM to meet cancer survivors' symptom and nutritional needs to promote their health and well-being.

Our study has several limitations. First, we exclusively enrolled participants from a patient support group in Beijing, China. This may add bias to the results because cancer survivors from a self-support group could have higher levels of motivation and needs than other cancer survivors.[47-49] Also, survivors from cities such as Beijing will have different understandings and attitudes toward survivorship care and TCM than rural residents.[50] Furthermore, compared with existing instruments, the seven-item, investigator-developed instrument (Brief Chinese Cancer Survivorship Needs Scale) that we used in this study sought to evaluate the broad categories of needs and did not include detailed items within each perceived needs domain.[51,52] Although our brief instrument has good reliability, future research should include development of a specific instrument with clear reliability that accurately measures the needs of cancer survivors.

Despite these limitations, this is the first study, to our knowledge, conducted among Chinese cancer survivors to evaluate their needs and willingness to use TCM for survivorship care. Our findings provide an initial estimate of the perceived needs

of mainland Chinese cancer survivors. We have also demonstrated that these perceived needs have an impact on their willingness to use TCM during survivorship care. Our study clarifies the potential role of integrating TCM to meet cancer survivors' needs, especially symptom and nutritional needs. By further investigating how to target specific TCM interventions to treat certain symptom or nutritional needs of cancer survivors, we can develop clinical studies to provide more evidence on integrating TCM into cancer survivorship care health services.

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