



The Correlation of Traditional Chinese Medicine Deficiency Syndromes, Cancer Related Fatigue, and Quality of Life in Breast Cancer Patients

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Abstract

Background: To evaluate the correlation between the different traditional Chinese medicine (TCM) deficiency syndromes, cancer related fatigue (CRF), and quality of life (QoL) in breast cancer patients.

Patients and methods: Ninety-five breast cancer patients were categorized into different qi (氣 qì), blood (血 xuè), yin (陰 yīn), and yang (陽 yáng) TCM deficiency syndrome groups (DSGs). We used the ICD-10 for diagnosing CRF. The QoL was assessed by the WHO-BREF and Short Form Health Survey (SF12) questionnaires. The major outcome was to compare the QoL scores between the different TCM DSGs. The second outcome was the intergroup analysis between the CRF and different TCM DSGs in breast cancer patients.

Results: The patients with qi deficiency (氣虛 qì xū) had a higher correlation with CRF ($p=0.001$) and poorer QoL both in the WHO-BREF and SF12 survey ($p<0.001$), whereas the patients with yin deficiency (陰虛 yīn xū) had poorer QoL in the psychological ($p=0.02$) and social aspects ($p=0.04$). The qi deficiency (氣虛 qì xū) syndrome was closely associated with yin deficiency syndrome (陰虛 yīn xū). ($p=0.03$).

Conclusion: Our study confirmed the concept of Qi-deficiency (氣虛 qì xū) in TCM was associated with CRF as identified in cancer care in western medicine. The breast cancer patients with qi deficiency (氣虛 qì xū) have poorer QoL. Treatment of CRF and improving QoL by supplying qi (氣 qì) may warrant further investigation.

Key words: Traditional Chinese Medicine; Deficiency syndromes; Cancer-related Fatigue; Quality of life; Breast cancer

Introduction

TCM has been applied in cancer patient's care in recent decades. The different types of deficiency syndrome in TCM is an important concept to categorize the patients as lacking some specific element. (qi, blood, yin, yang) (氣 qì, 血 xuè, 陰 yīn, 陽 yáng). In brief, qi (氣 qì) refers to the vital energy of the body. It

maintains blood circulation, warms the body, and fights diseases. The blood nourishes the body, moistens body tissues, and ensures they do not dry out. Yin (陰 yīn) and yang (陽 yáng) are complementary opposites that interact within a greater whole, as part of a dynamic system. Generally, anything that is moving, ascending, bright, progressing, hyperactive, including functional

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diseases of the body, pertains to yang (陽 yáng). The characteristics of stillness, descending, darkness, degeneration, hypo-activity, including organic disease, pertain to yin (陰 yīn).

Patients with any type of deficiency syndrome may also have the symptoms of weakness, low energy, anemia etc, which are roughly described as fatigue-like sensations in western medicine. Fatigue is a common and distressing problem for cancer patients (Vogelzang *et al.*, 1997). In contrast to everyday or normal fatigue, CRF is characterized by feelings of tiredness and weakness despite adequate amounts of sleep and rest (Ahlberg *et al.*, 2003; Portenoy and Itri, 1999). Further, QoL is a significant concern for cancer patients, and its disruption is often associated with symptoms such as fatigue, insomnia, and psychological distress (Bower *et al.*, 2000; Portenoy, 2000). Several studies have focused on CRF and QoL in cancer patients (Gupta *et al.*, 2007; Sadler *et al.*, 2002), although there is limited data on the association of CRF with TCM deficiency syndrome.

Besides, we do not know the correlation of different TCM deficiencies and QoL, and the cross talk on TCM deficiency syndrome with the fatigue so far is unclear. A previous study showed breast cancer patients are a homogenous group with a high percentage of fatigue (Mast, 1998).

Accordingly, there is a compelling need to better understand the correlation among the TCM deficiency syndromes, CRF, and QoL in breast cancer patients.

Method

Study design and subjects

The study was conducted between Mar, 2010 to Mar, 2011 in Taipei City Hospital, Taiwan. Among the 331 registered cancer patients, 95 breast cancer patients were enrolled. A trained clinical coordinator described the study and determined eligibility after patients signed in at the oncology department. Eligible patients were presented with the questionnaires at their initial visit and returned their completed questionnaires to the clinical coordinator within 24 hours. The study was approved by the Institutional Review Board at Taipei United Hospital. The eligibility criteria included (1) aged between 18 and 70 years, (2) breast cancer diagnosis confirmed by a professional physician, (3) Chinese as spoken language. Patients were excluded if with (1) unconsciousness, (2) delirium and psychiatric problems, (3) complications present, and (4) inability and unwillingness to give informed consent or were unable

Table 1. Classification Criteria for the diagnosis of TCM deficiency syndrome groups

In the past week, did you often have the following symptoms? (Often means more than 8 hours per day and more than four days per week)	
Qi Deficiency syndrome (氣虛 qì xū)	<ol style="list-style-type: none"> 1. Felt exhausted or lack of energy 2. Did not feel like talking or talked in a low and weak voice. 3. Did not feel like moving about or did not have the strength to walk.
Blood Deficiency syndrome (血虛 xuè xū)	<ol style="list-style-type: none"> 1. Dizziness 2. Pale looking face or nails 3. Hair drop/Hair loss)
Yin Deficiency syndrome (陰虛 yīn xū)	<ol style="list-style-type: none"> 1. Dry eyes or mouth 2. Night sweats 3. Palm or face flushing sensation
Yang Deficiency syndrome (陽虛 yáng xū)	<ol style="list-style-type: none"> 1. afraid of cold 2. limbs feel cold 3. wish to have hot drinks

Definition:

* Patients who have 2 of 3 or more of the criteria in the Qi Deficiency, Blood Deficiency, Yin Deficiency, Yan Deficiency groups are compatible with that TCM syndrome.

to understand or cooperate with the study conditions.

TCM DSGs defined

Deficiency syndrome is a TCM condition with weakness and lack of energy. All patients were categorized into qi (氣 qì), blood (血 xuè), yin (陰 yīn), and yang (陽 yáng) DSGs if they met the diagnosed criteria (having more than 2 out of 3 of the symptoms of the corresponding deficiency syndrome (Table 1). The validity and reliability of the diagnostic criteria were applied in our TCM study and well defined as an alpha coefficient of 0.89 and Cronbach's alpha coefficient of 0.88 through a validation test.

CRF defined

There are several screening instruments used in CRF survey (Alexander *et al.*, 2009; Hann *et al.*, 2000). The fatigue assessment in this study was performed according to the ICD-10 for CRF (Table 2) (Cella *et al.*, 2001). It was designed to be considerably more discriminating and demanding. Six of the eleven criteria, as well as self-reported functional limitations, are prerequisites for diagnosis. Patients who reported experiencing fatigue for at least a few days each month during treatment were asked a series of questions regarding the impact of fatigue on their daily functioning, including physical, emotional, behavioral, social, occupational, and economic factors. Questions about how patients coped with fatigue during and after treatment were supplemented by questions about their

Table 2. Proposed ICD-10 Criteria for Cancer-Related Fatigue

A. Six (or more) of the following symptoms have been present every day or nearly every day during the same 2-week period in the past month, and at least one of the symptoms is (1) significant fatigue.

1. Significant fatigue, diminished energy, or increased need to rest, disproportionate to any recent change in activity level.
2. Complaints of generalized weakness or limb heaviness.
3. Diminished concentration or attention.
4. Decreased motivation or interest to engage in usual activities.
5. Insomnia or hypersomnia
6. Sleep is unrefreshing or nonrestorative.
7. Perceived need to struggle to overcome inactivity.
8. Marked emotional reactivity (e.g., sadness, frustration, or irritability) to feeling fatigued.
9. Difficulty completing daily tasks attributed to feeling fatigued.
10. Perceived problems with short-term memory.
11. Post-exertion malaise lasting several hours.

B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

C. There is evidence from the history, physical examination, or laboratory findings that the symptoms are a consequence of cancer or cancer therapy.

D. The symptoms are not primarily a consequence of co-morbid psychiatric disorders such as major depression, somatization disorder, somatoform disorder, or delirium.

current level of fatigue. This was done specifically to estimate the prevalence of CRF as defined by the proposed ICD-10 criteria (Van Belle *et al.*, 2005).

QoL defined

The QoL was assessed by the WHO-BREF and SF12 questionnaires in this study. The WHOQOL-BREF instrument comprises 26 items, measuring the following broad domains: physical health, psychological health, social relationships, and environment. The SF-12 is a multipurpose short form survey with 12 questions, all selected from the SF-36 Health Survey (Ware *et al.*, 1998). The questions were combined, scored, and weighted to create two scales that provide glimpses into mental and physical functioning and overall health-related-quality of life. The standard SF12 Health survey was weighted and summed to provide easily interpretable scales for physical and mental health.

The Physical and Mental Health Composite Scores (PCS & MCS) were then computed using the scores of twelve questions ranging from 0 to 100, where a zero score indicated the lowest level of health and 100 indicated the highest level of health (Müller-Nordhorn *et al.* 2001 ;Ware *et al.* 1998).

Outcome measurements

This study was designed to evaluate the correlation between TCM deficiency syndrome, CRF, and QoL in breast cancer patients. The major outcome was to compare the QoL scores between the with/without different TCM deficiency syndrome groups in breast

cancer patients. The second outcome was the intergroup analysis between the CRF and different TCM DSGs and the comparison between with/without CRF in breast cancer patients.

Statistical analyses

The SPSS statistical package (version 17.0 for Windows; SPSS Inc.) was used for data entry and analysis. Demographics data was presented by descriptive statistics with mean and percentage. The outcome measures on QoL and CRF between with and without different TCM DSGs were compared using student t-test. The Chi-square test was applied to compare the fatigue of different TCM DSGs and the intergroup analysis. All p values were two tailed and the level of significance was set at 0.05.

Results

Demographics and clinical features of cancer patients

Of the total 95 breast cancer patients, the means (SD) of age, body mass index (BMI), and systolic/diastolic blood pressure were 57.1 (8.7) years, 23.5 (3.7) kg/m², 125.9 (15.7)/75.1(8.8) mmHg, respectively. Most patients were 40-60 years old, which was compatible with the breast cancer epidemiology. Table 3 showed the baseline characteristics of the patients in different TCM DSGs. Twenty-four percent of patients were diagnosed with CRF and 43.2% of CRF had qi (氣 qi) DSG. Otherwise, 73.7% participants were showed relatively good performance (Eastern Cooperative Oncology Group, ECOG≤1); 48.4% were under chemotherapy.

The comparison of QoL's scores between the with/without different TCM DSGs

Table 4 showed the comparison of QoL's scores for the with/without different TCM DSGs. The patients with qi deficiency (氣虛 qi xū) syndrome had lower QoL's scores in all domains of the WHO- BREF and SF12 survey. Besides, qi deficiency (氣虛 qi xū) significantly affected the QoL in the WHO- BREF physical, psychological (p<0.001), social relations (p=0.005), environment aspects (p=0.004), and mental aspect in SF12 (p<0.001). The blood deficiency (血虛 xuè xū) syndrome group had less impact on quality of life than qi deficiency (氣虛 qi xū), but significance was noted in the physical and psychological aspects (p=0.02; 0.04). Otherwise, yin deficiency (陰虛 yīn xū) was correlated with psychological (p=0.02) and social relations' QoL domains (p=0.04) in the WHO-BREF, and also influenced the mental condition in the SF12

Table 3. Demographic characteristics of the participants.

		Qi deficiency (氣虛 qì xū)		Blood deficiency (血虛 xuè xū)		Yin deficiency (陰虛 yīn xū)		Yang deficiency (陽虛 yáng xū)		Total	
		n	%	n	%	n	%	n	%	n	%
Age (years)	<40	0	0	0	0	1	2.5	2	7.1	3	3.2
	41-50	6	16.2	5	19.2	7	17.5	6	21.5	17	17.9
	51-60	21	56.8	14	53.9	23	57.5	13	46.4	50	52.6
	61-70	5	13.5	5	19.2	6	15.0	7	25.0	19	20.0
	>70	5	13.5	2	7.7	3	7.5	0	0	6	6.3
Body mass index (kg/m ²)	≤18.5	7	18.9	2	7.7	3	7.5	2	7.1	7	7.4
	18.5-23.9	16	43.3	16	61.5	19	47.5	15	53.6	47	49.5
	24.0-26.9	10	27.0	5	19.2	12	30.0	10	35.7	27	28.4
	≥27	4	10.8	3	11.6	6	15.0	1	3.6	14	14.7
Systolic blood pressure (mmHg)	≤120	13	35.1	11	42.3	16	40.0	10	35.7	34	35.8
	>120	24	64.9	15	57.7	24	60.0	18	54.3	61	64.2
Diastolic blood pressure (mmHg)	≤90	33	89.2	25	96.1	36	90.0	27	96.4	87	90.8
	>90	4	10.8	1	3.9	4	10.0	1	3.6	8	9.2
Fatigue	Yes	16	43.2	8	30.8	14	35.0	9	32.1	23	24.2
	No	21	56.8	18	69.2	26	65.0	19	67.9	72	75.8
Eastern Cooperative Oncology Group	≤1	23	62.2	16	61.5	30	75.0	20	71.4	70	73.7
	>1	14	37.8	10	18.5	10	25.0	8	28.6	25	26.3
Religion	Christianity	3	8.1	3	11.5	4	10.0	2	7.1	10	10.5
	Buddhism	16	43.3	12	46.2	18	45.0	15	53.6	46	48.4
	Taoism & Ikuantao	3	8.1	3	11.5	4	10.0	1	3.6	7	7.4
	Taiwanese folk religion	9	24.3	6	23.1	10	25.0	5	17.9	23	24.2
	Others	1	2.7	0	0	1	2.5	1	3.6	2	3.1
	NO	5	13.5	2	7.7	3	7.5	4	14.3	7	7.4
Current treatment	Chemotherapy	22	59.5	19	73.1	22	55.0	14	50.0	46	48.4
	Non chemotherapy	15	40.5	7	26.9	18	45.0	14	50.0	49	51.6
Treatment intention	Curative intent	14	37.9	11	42.3	16	40.0	9	32.1	35	36.9
	Palliative intent	11	29.7	10	38.5	9	22.5	8	28.6	23	24.2
	Following	12	32.4	5	19.2	15	37.5	11	39.3	37	38.9
Disease Status	Disease free	3	8.1	0	0	7	17.5	2	7.1	14	14.7
	Disease stable	13	35.2	6	23.1	11	27.5	11	39.3	32	33.7
	Local advance	9	24.3	12	46.2	9	22.5	8	28.6	27	28.4
	Metastatic disease	12	32.4	8	30.8	13	32.5	7	25.0	22	23.2

Table 4. Comparison of QoL's scores among the with / without different TCM deficiency syndrome groups in breast cancer patients

Characteristics	Qi deficiency (氣虛 qì xū)			Blood deficiency (血虛 xuè xū)			Yin deficiency (陰虛 yīn xū)			Yang deficiency (陽虛 yáng xū)		
	With (n=37)	Without (n=58)	p-value	With (n=26)	Without (n=69)	p-value	With (n=40)	Without (n=55)	p-value	With (n=28)	Without (n=67)	p-value
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Age (years)	59.1(9.3)	55.7(8.0)	0.06	58.2(8.0)	56.6(8.9)	0.44	56.4(7.8)	57.5(9.3)	0.54	55.1(8.1)	57.9(8.9)	0.16
BMI ^a (kg/m ²)	22.6(3.9)	24.0(3.5)	0.08	23.2(3.3)	23.6(3.9)	0.66	23.7(3.5)	23.4(3.9)	0.69	22.7(2.8)	23.8(4.0)	0.14
SBP ^b (mmHg)	125.6(13.8)	126.0(16.9)	0.89	121.7(9.9)	127.4(17.3)	0.13	122.8(12.4)	128.1(17.5)	0.12	123.2(13.4)	127.0(16.6)	0.30
DBP ^c (mmHg)	75.4(8.3)	75.0(9.2)	0.83	74.6(7.4)	75.3(9.4)	0.73	74.7(8.0)	75.4(9.5)	0.69	72.6(8.7)	76.2(8.7)	0.08
ECOG ^d	(%)	(%)		(%)	(%)		(%)	(%)		(%)	(%)	
0-1	62.2	81.0	0.06	61.5	78.3	0.12	75.0	72.7	1.00	71.4	74.6	0.80
2-4	37.8	19.0		38.5	21.7		25.0	27.3		28.6	25.4	
WHO BREF Life-Quality Scores												
Physical	50.5(13.8)	66.9(14.4)	<0.001	54.6(14.2)	63.8(16.3)	0.02	58.6(16.1)	62.9(16.2)	0.25	59.3(13.4)	61.8(17.3)	0.52
Psychological	64.0(16.5)	75.9(12.9)	<0.001	66.4(16.0)	73.9(14.6)	0.04	67.1(16.1)	74.9(14.0)	0.02	67.1(15.8)	73.5(14.8)	0.09
Social relations	67.3(15.9)	76.1(11.7)	0.005	72.6(14.8)	73.1(13.6)	0.89	69.2(14.7)	75.7(12.8)	0.04	70.8(11.0)	73.8(14.9)	0.38
Environment	65.8(18.9)	77.3(10.7)	0.004	71.6(12.4)	73.9(16.2)	0.52	69.8(15.3)	75.8(14.6)	0.07	73.5(10.9)	73.1(16.6)	0.91
SF-12 Life quality scores												
PCS-12 ^e	34.0(9.8)	40.6(9.7)	0.006	35.8(9.2)	39.0(10.6)	0.22	37.6(9.5)	38.3(10.9)	0.75	37.3(9.5)	38.4(10.6)	0.66
MCS-12 ^f	38.9(8.6)	46.8(9.3)	<0.001	41.0(9.3)	44.9(9.9)	0.11	40.6(10.3)	46.5(8.5)	0.008	39.9(10.1)	45.4(9.2)	0.02

a, BMI = Body mass index

b, SBP = systolic blood pressure

c, DBP = diastolic blood pressure

d, ECOG = Eastern Cooperative Oncology Group

e, PCS = physical condition score

f, MCS = mental condition score

Table 5. Intergroup analysis of the CRF and different TCM deficiency syndrome groups in breast cancer patients

		Fatigue	Qi deficiency (氣虛 qì xū)	Blood deficiency (血虛 xuè xū)	Yin deficiency (陰虛 yīn xū)	Yang deficiency (陽虛 yáng xū)
		(%)	(%)	(%)	(%)	(%)
Qi deficiency (氣虛 qì xū)	With	43.2	---	---	---	---
	Without	12.1	---	---	---	---
	<i>p</i> -value	0.001	---	---	---	---
Blood deficiency (血虛 xuè xū)	With	30.8	53.8	---	---	---
	Without	21.7	33.3	---	---	---
	<i>p</i> -value	0.42	0.10	---	---	---
Yin deficiency (陰虛 yīn xū)	With	35.5	52.5	30.0	---	---
	Without	16.4	29.1	25.5	---	---
	<i>p</i> -value	0.05	0.03	0.65	---	---
Yang deficiency (陽虛 yáng xū)	With	32.1	46.4	32.1	35.7	---
	Without	20.9	35.8	25.4	44.8	---
	<i>p</i> -value	0.30	0.36	0.61	0.49	---

survey ($p=0.008$), whereas yang deficiency (陽虛 yáng xū) was only related to Mental condition in the SF12 survey ($p=0.02$).

The intergroup analysis between the CRF and different TCM DSGs

Table 5 displays the intergroup analysis between the CRF and different TCM DSGs. Breast cancer patients with qi deficiency (氣虛 qì xū) had a significantly high percentage of CRF diagnosis (43.2%:12.1%; $p=0.001$), whereas the patients with yin deficiency (陰虛 yīn xū) also had CRF (35.5%:16.4%; $p=0.05$). The intergroup analysis of TCM deficiency syndrome revealed patients with qi deficiency (氣虛 qì xū) also tended to have yin deficiency (陰虛 yīn xū) ($p=0.03$).

Comparison between with/without CRF in breast cancer patients

Table 6 compared the patients' QoL scores and the TCM deficiency syndrome status between the with/without CRF. Patients with CRF had a higher percentage of qi deficiency (氣虛 qì xū) with great significance (69.6%: 29.2%; $p=0.001$). Deeper analysis also noted breast cancer patients with CRF also had poorer QoL over all domains in the WHO-BREF (physical: $p<0.001$; psychological: $p=0.003$; social: $p<0.001$; environment: $p<0.001$) and SF12 assessments. (PCS: $p=0.001$; MCS: $p=0.008$).

Discussion

Our initial findings that showed women with breast cancer with TCM deficiency syndrome and CRF had poor QoL scores. Among DSGs, the qi deficiency (氣虛 qì xū) group had the highest amount of CRF (43.2%:12.1%; $p=0.001$) and the lowest QoL's scores over the physical, psychological, social relations and environment aspects both in the WHO-BREF and SF12

Table 6. Comparison of with / without CRF in breast cancer patients

Characteristics	Fatigue		<i>p</i> -value
	With (n=23) Mean (SD)	Without (n=72) Mean (SD)	
Age (years)	57.4(9.2)	57.0(8.6)	0.86
BMI ^a (kg/m ²)	22.9(3.2)	23.7(3.9)	0.41
SBP ^b (mmHg)	126.3(11.9)	125.7(16.8)	0.89
DBP ^c (mmHg)	76.6(6.3)	74.7(9.5)	0.37
ECOG ^d	(%)	(%)	
0-1	60.9	77.8	0.06
2-4	39.1	22.2	
TCM ^e deficiency syndrome	(%)	(%)	
Qi deficiency (氣虛 qì xū)	69.6	29.2	0.001
Blood deficiency (血虛 xuè xū)	34.8	25.0	0.42
Yin deficiency (陰虛 yīn xū)	60.9	36.1	0.05
Yang deficiency (陽虛 yáng xū)	39.1	26.4	0.30
WHO BREF Life-Quality Scores			
Physical	48.3(13.5)	66.1(14.4)	<0.001
Psychological	63.7(15.0)	74.7(14.4)	0.003
Social relations	62.8(15.4)	76.8(11.2)	<0.001
Environment	61.7(17.4)	77.6(11.6)	<0.001
SF-12 Life quality scores			
PCS-12 ^f	32.4(8.7)	40.4(9.9)	0.001
MCS-12 ^g	39.3(8.9)	45.6(9.6)	0.008

a, BMI = Body mass index

b, SBP = systolic blood pressure

c, DBP = diastolic blood pressure

d, ECOG = Eastern Cooperative Oncology Group

e, TCM = Traditional Chinese medicine

f, PCS = physical condition score

g, MCS = mental condition score

surveys (Table 4). The element "Qi" (氣 qì) seems to play a critical role in the QoL of breast cancer patients. Lee et al (2005) also noted that qi (氣 qì) therapy may have beneficial psychological, physiological and immunological effects on health and help patients cope with their pain and mood disturbances (Lee et al., 2005).

The concept of TCM different deficiency syndrome has been widely applied in clinical practice in TCM for a long time. Doctors prescribe herb medication for the patients based on the type of syndrome. In our study, the analysis of the different deficiency syndromes

indicated “qi” (氣 qì) is the most important element affecting the QoL in breast cancer patients, while a similar phenomenon has been noted in advanced non-small cell lung cancer (Yuan *et al.*, 2011). Reviewing the ancient Chinese medication books, “qi” (氣 qì) is the commander of blood (血 xuè), and blood (血 xuè) is the mother of qi (氣 qì) (Tierra and Tierra, 1998). This means qi (氣 qì) attaches to the blood (血 xuè) and blood (血 xuè) supplies qi (氣 qì). This is also a manifestation of the mutual restriction of yin and yang. In TCM theory, “qi” (氣 qì) is the vital substance constituting the human body. It also refers to the physiologic functions of the organs and meridians in the human body with five functions: promoting, warming, defending, controlling and steaming. In fact, it may be difficult to find one equivalent English word that adequately describes its functions and properties. Several studies have indicated the positive effect of qi (氣 qì) therapy on symptom management and mood improvement in cancer patients (Lee *et al.*, 2001; Lee *et al.*, 2005), which may be compatible with our findings that qi (氣 qì) is one of the most important elements in health balance. It significantly affects QoL and is correlated with CRF. Future study on qi (氣 qì) therapy should more deeply examine the breast cancer patients.

Further, patients with qi deficiency (氣虛 qì xū) had a high correlation with yin deficiency (陰虛 yīn xū) ($p=0.03$) in this study. Although there is a lack retrospective data on the relationships in syndrome intergroup analysis, some studies indicated yin deficiency (陰虛 yīn xū) may lead to impaired autonomic nervous system function in patients with metastatic cancer (Lin and Chen, 2010). Patients who lack the energy of qi (氣 qì) may simultaneously lack yin. (陰 yīn) Since yin in TCM represents a state of the human body lacking nutrition and fluid, yin deficiency (陰虛 yīn xū) is commonly seen in the late stage of cancer patients (Lin *et al.*, 2008). It is no wonder that a certain percentage of patients with qi deficiency (氣虛 qì xū) also have yin deficiency (陰虛 yīn xū). We presume it may represent a more advanced disease status that is compatible with multiple elements deficiency.

Regarding CRF, patients with CRF also have a greater percentage of deficiency syndromes, especially qi deficiency (氣虛 qì xū) and yin deficiency (陰虛 yīn xū) (Table 6). Meanwhile, much worse QoL scores were noted in patients with CRF groups over all physical, psychological, social relations, environment, and PCS-12, MCS-12 domains. Some studies have also indicated that patients with CRF have worse QoL and

more cancer related symptoms that require management (Buchanan *et al.* 2005; Cavalli Kluthcovsky *et al.* 2011). Interestingly, there are some relationships between CRF and qi deficiency (氣虛 qì xū). We found 69.6% of patients with CRF have qi deficiency (氣虛 qì xū) while only 43.2% of patients with qi deficiency (氣虛 qì xū) have CRF, though both show statistical significance. This might be due to the diagnostic criteria of CRF (ICD.10), specifically excluding patients whose fatigue was considered to be caused by co-morbid psychiatric disorders, whereas qi deficiency (氣虛 qì xū) might detect the cancer related symptoms more broadly. Since there is an overlapping of the patients noted in CRF and qi deficiency (氣虛 qì xū) clinically, the patients who were diagnosed early as having qi deficiency (氣虛 qì xū) may also remind the doctor to prescribe qi (氣 qì) related therapy and support earlier.

There are still limitations to this study. First, the sample size is relatively small ($n=95$), so a larger population of cancer patients will be required in a future study. Second, the treatment modalities or the patients' disease status may display some bias on the QoL survey, and the association of these factors should be investigated in future studies.

In conclusion, patients with TCM deficiency syndromes had poorer QoL and CRF, which may need to be managed early, especially the qi deficiency (氣虛 qì xū) groups. The “qi” (氣 qì) may play an important role in the health balance of breast cancer patients. Therefore, qi (氣 qì) supply treatment may have a promising role in palliating the cancer related symptoms and improving the QoL. Qi (氣 qì) and yin (陰 yīn), are closely related to each other and need to be treated at the same time. Further research in this field would be of great help in TCM development of breast cancer patients' care.

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