

Are five viscera involved in anxiety and depression?

Abstract

This study aimed to clarify the visceral patterns associated with anxiety and mood disorders, as well as anxious and depressive states. 914 new cases at a psychosomatic clinic of a tertiary medical care center were assessed. The severity of 11 visceral patterns was analyzed according to the main described symptoms and a comprehensive questionnaire.

Multiple logistic regression analysis revealed that all the viscera except for kidney was significantly associated with any mood or anxiety disorder. Liver Qi depression was significantly associated with static anxiety, while liver fire flames upward and phlegm clouding the pericardium were significantly associated with abrupt anxiety in females. We also demonstrated a significant relationship between phlegm-fire harassing the heart and dysthymic disorder in females. Phlegm clouding the pericardium was associated with an anxiety state, a depressive state and major depression in both sexes. Dual deficiency of the heart and spleen was significantly associated with a depressive state and the diagnosis of major depression in males. Heart yin deficiency was associated with an anxiety state, generalized anxiety disorder, panic disorder and a depressive state in females.

Different patterns are associated with anxiety state, depressive state, generalized anxiety disorder, panic disorder, major depression and dysthymic disorder. The patterns also vary between sexes.

Keywords: anxiety disorders, mood disorders, depression, dysthymic disorder, medicine, east Asian traditional, medicine, kampo, panic disorder, generalized anxiety disorder

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Introduction

Kampo, acupuncture or moxibustion therapy may help the recovery of patients with anxiety or mood disorders, who previously failed to respond successfully to undifferentiated occidental therapy (antidepressants or anxiolytic agents). It was reported that a combined treatment of antidepressant, paroxetine and electro acupuncture was more effective at combating depressive disorders than paroxetine alone.¹ Mood disorders, anxiety disorders and insomnia have been treated with empirical therapy by using Kampo recipes for liver Qi depression,² intense heart fire,³ dual deficiency of the heart and spleen syndrome,¹ and yin deficiency phlegm-fire harassing the heart,⁴ phlegm turbidity,⁴ or phlegm clouding the pericardium.⁴ When associated with these disorders, yin deficiency is categorized into three forms: liver, heart and kidney yin deficiency.

However, there is no systematic report on what traditional Chinese patterns are associated with anxiety and mood disorders based on statistical analysis. Thus, we supposed that it would be useful to investigate the association between these visceral patterns and the disorder diagnosis statistically. Since Oriental medicine is effective for subclinical status,⁵ the extent of subclinical anxiety and depressive state was also assessed using psychological questionnaires.^{6,7} Since some patterns are characteristic of abrupt symptoms, abrupt anxiety state was distinguished from continuous anxiety state using the questionnaire. The extent of visceral patterns for each patient was calculated based on the main complaints and answers to a comprehensive questionnaire asking not only psychiatric but also somatic symptoms.⁸ It was investigated whether the rate of anxiety and mood disorders are independent of the extent of traditional Chinese patterns or not.

Materials and methods

Subjects

This study included all the 914 outpatients that, for the first time, visited the Department of Psychosomatic Medicine at the Kyushu University Hospital (a tertiary medical care center) from June 2000 to March 2001. Approximately half were walk-in patients and the remaining were referrals. After pre-examination by a physician so a provisional diagnosis could be made, the patients were assigned to the attending physicians and given a thorough checkup. Subjects with organic neurological disorders, endocrine disorders, neoplasms, vascular disorders, infections, degenerative diseases or traumatism were excluded from the analyses. If a diagnosis could not be identified, the subject was excluded from the study. Other exclusion criteria include failure of the patient to complete the Medical Index (KMI) questionnaire (more than 21 questions unanswered) or to describe the main complaints. Thus, a total of 579 subjects were included, and all the patients provided written informed consent to participate in the study. The Research Ethics Committee of Graduate School of Medical Sciences, Kyushu University, approved the protocol of the present survey, whose approval reference number was 20-95.

Assessment of symptoms

All the preliminary examinations were conducted by physicians who specialized in psychosomatic medicine. Both all of them and all the attending physicians were familiar with not only psychosomatic medicine but also clinical psychiatry, since they routinely examine patients with mood disorders, anxiety disorders, somatoform disorders and eating disorders.

At the preliminary examination, each outpatient completed three questionnaires and an interview to enable diagnosis. All the patients were asked to describe their main symptoms (up to three complaints aiming at operational efficiency improvement). The questionnaires included the KMI, a modification of the Cornell Medical Index-Health Questionnaire,⁸ STAI and SDS. The KMI consists of 103 yes-or-no questions, which include two comprehensive questions, as well as two questions on past history, two on family history, 50 on psychiatric symptoms and 47 on somatic symptoms. It has been reported that this measure could distinguish healthy controls from patients with neurotic disorders and those with psychosomatic disorders.

Apart from diagnosis, the extent of psychological status was assessed in order to detect subclinical depressive and anxiety states. Subjective psychiatric symptoms associated with depressive state were assessed by the SDS questionnaire. The extent of state anxiety, which means the basal level of the continuous anxiety, and trait anxiety, which means tendency to get anxious, was assessed by the STAI-I,⁹ and STAI-II, respectively. If some of the questions in these questionnaires were unanswered, the full points were calculated without these questions.

Diagnoses

After the preliminary examination, the patients were assigned to the attending physicians. A diagnosis was provided by the attending physician for each patient, according to DSM-IV.

Identification of visceral patterns

The number of the symptoms according to Kampo, acupuncture and moxibustion therapy theory was calculated from the answers to KMI and according to the main symptom complaints. Since there are no reports on a systematic scoring system according to traditional Chinese medicine, the scoring was conducted provisionally as follows. The symptom that was regarded to be the principal complaint was considered one point for each visceral pattern. Symptoms that were not described as a main complaint, but were mentioned in the KMI, were regarded as half a point for each visceral pattern, since these

symptoms can be regarded as relatively minor. The correspondence between the symptoms described as main complaints or featured in the KMI, and each visceral pattern is shown in [Appendix 1, 2, 3 and 4](#), in which the KMI question numbers are also provided. The visceral pattern values were expressed as percentages. The World Health Organization (WHO) International Standard terminologies on traditional medicine in the Western Pacific region,¹⁰ were referred to for all the traditional Chinese medicine terminologies.

Statistics

All analyses were performed using Stata version 10.1 (Stata Corp., College Station, TX, USA). Welch's t test was used to compare the mean continuous variables of the two groups. Multiple logistic regression analyses were performed to estimate the association between the prevalence of occidental diagnoses and each visceral pattern, adjusted for age (< 40 or >40 years old). If any case numbers were zero, logistic regression analyses were performed without adjusting for age. A two-sided p-value of 0.05 was considered to be statistically significant.

Results and discussion

Demographic and occidental status

The demographic and occidental aspects of the subjects are shown in Table 1. The continuous variables are shown as mean \pm standard deviation. The numbers and percentages of patients with each disorder are provided as well. The mean age of the subjects was 36.4 years old, with no significant difference in sex. The prevalence of mood, anxiety, eating, and somatoform disorders was 54.2, 19.5, 10.9 and 7.6 %, respectively. The total number of patients with sub classified diseases did not equal the number in each corresponding major division, owing to overlapping. There were some overlaps between psychiatric disorders and psychosomatic disorders. Thus, psychosomatic disorders and psychiatric disorders were not differentiated from each other. However, all the disorders concerning the statistical analyses, that are mood and anxiety disorders, were diagnosed according to DSM-IV only.

Table 1 Demographic data on subjects

	Female (n = 364)	Male (n = 215)	Total (n = 579)
Age	36.5 \pm 17.0	36.3 \pm 16.7	36.4 \pm 16.9
SDS (points)	52.1 \pm 10.1	48.4 \pm 10.3	50.6 \pm 10.3
STAI-I (points)	55.4 \pm 11.2	53.7 \pm 11.8	54.8 \pm 11.5
STAI-II (points)	56.1 \pm 11.7	53.9 \pm 12.3	55.3 \pm 12.0
KMI category B questions (points)	23.5 \pm 10.3	22.9 \pm 10.6	23.3 \pm 10.4
KMI category C questions (points)	16.0 \pm 8.2	14.3 \pm 7.5	15.4 \pm 8.0
Mood disorders	205 (56.3)	109 (50.7)	314 (54.2)
Major depression	158 (43.4)	79 (36.7)	237 (46.8)
Dysthymic disorder	23 (6.3)	8 (3.7)	31 (5.4)
Depressive disorder not otherwise specified	42 (11.5)	29 (13.5)	71 (12.3)
Anxiety disorders	71 (19.5)	44 (20.5)	115 (19.9)
Generalized anxiety disorder	35 (9.6)	22 (10.2)	57 (9.8)
Specific phobia	3 (0.8)	2 (0.9)	5 (0.9)
Panic disorder	24 (6.6)	11 (5.1)	35 (6.0)
Posttraumatic stress disorder	1 (0.3)	2 (0.9)	3 (0.5)
Social anxiety disorder	4 (1.1)	8 (3.7)	12 (2.1)

Table I Continued...

	Female (n = 364)	Male (n = 215)	Total (n = 579)
Obsessive compulsive disorder	5 (1.4)	1 (0.5)	6 (1.0)
Eating disorders	57 (15.7)	6 (2.8)	63 (10.9)
Anorexia Nervosa	17 (4.7)	3 (1.4)	20 (3.5)
Bulimia Nervosa	27 (7.4)	1 (0.5)	28 (4.8)
Eating disorder not otherwise specified	13 (3.6)	2 (0.9)	15 (2.6)
Somatoform disorders	28 (7.7)	16 (7.4)	44 (7.6)
Conversion disorder	4 (1.1)	0 (0.0)	4 (0.7)
Hypochondriasis	3 (0.8)	3 (1.4)	6 (1.0)
Somatization disorder	1 (0.3)	0 (0.0)	1 (0.2)
Pain disorder	15 (4.1)	10 (4.7)	25 (4.3)
Somatoform disorder not otherwise specified	4 (1.1)	2 (0.9)	6 (1.0)
Schizophrenia	3 (0.8)	5 (2.3)	8 (1.4)
Primary insomnia	7 (1.9)	13 (6.0)	20 (3.5)
Dissociative disorders	2 (0.5)	0 (0.0)	2 (0.3)
The others	67 (18.4)	40 (18.6)	107 (18.5)

The numbers of patients are shown. Prevalence rates are expressed as percentages and enclosed within parentheses according to sex.

The average scores of STAI-I and STAI II were 54.8 and 55.3 points out of 80 points. The subjects with high state and trait anxiety, which correspond to 75 percentile,⁷ were 94.3 % and 83.2 %, respectively in females, and 87.2 % and 74.7 %, respectively in males out all the subjects.

The average score of SDS was 50.6 points out of 80 points. 35.6 % out of the subjects with major depression were considered to be relatively severe, since their SDS scores were more than 60 points out of 80 points, which has been reported to be the average score in patients with major depression.⁶ In the KMI, the average points score for category B questions (i.e., questions assessing psychiatric symptoms) was 23.3 out of 50, which was higher than the average reported previously for normal subjects (9.5 out of 50) and those with psychosomatic diseases (18.8 out of 50). However, it was lower than that of patients with neurosis (24.4 out of 50).⁸ The average points score for the somatic symptoms, classified by the KMI as category C questions, was 15.0 out of 47, which was higher than that of normal subjects (5.1 out of 47), that of patients with psychosomatic diseases (14.8 out of 47) and lower than that of neurosis (15.6 out of 47), from a previous report. Thus, the diagnosis of the subjects in this study ranged between psychosomatic disorders and neurosis.

Visceral patterns

In order to investigate visceral patterns according to sex, an analysis of covariance was performed. As shown in Table 2, dual vacuity of heart-spleen was significantly higher in females compared with males. There were no sex-dependent differences in the other visceral patterns.

Association between anxiety disorders and visceral patterns

To investigate the association between the diagnoses of anxiety or mood disorders provided by the attending physicians and visceral patterns, multiple logistic regression analyses adjusted for all the other visceral patterns were conducted by sex. The adjusted odds ratios (ORs) for a 10-point increase in each visceral pattern score

and its 95% confidence interval (CI) are shown in Table 3 & Table 4. The categorizing age had almost no effect on the results, although these data are not shown in the tables. The dependent variables were the whole anxiety disorders in addition to each, generalized anxiety disorder, and panic disorder in Table 3. Heart yin deficiency was significantly associated with all anxiety disorders in both sexes, and with generalized anxiety disorder and panic disorder in females. In females, phlegm-fire harassing the heart was also significantly associated with panic disorder. By contrast, intense heart fire was inversely associated with panic disorder, although this is also a type of heart pattern. In males, no visceral pattern was significantly associated with generalized anxiety disorder or panic disorder.

Association between mood disorders and visceral patterns

As shown in Table 4, phlegm turbidity in females and dual deficiency of the heart and spleen in males were significantly associated with mood disorders. The results varied between the sexes and according to the type of mood disorder. Phlegm clouding the pericardium was significantly associated with major depression in both sexes. In males, dual deficiency of the heart and spleen was also significantly associated with major depression. Males also demonstrated the inverse association of liver fire flaming upward with major depression. In addition, phlegm-fire harassing the heart was significantly associated with dysthymic disorder in females. Phlegm clouding the pericardium was inversely associated with depressive disorder not otherwise specified in both sexes.

Association between visceral patterns and psychological questionnaire scores

In order to investigate the visceral patterns associated with the psychological defects, as well as the diagnoses of psychiatric disorders, multiple logistic regression analysis was performed, adjusted for age (< 40 or >40 years old) and all the other visceral patterns. The dependent variable was the extent of the depressive state (as assessed by the SDS), state anxiety (as assessed by the STAI-I), or trait anxiety (as assessed by the STAI-II). The adjusted ORs for 10-point increases in visceral pattern scores are shown in Table 5.

Table 2 Visceral pattern scores

	Men (n=215)			Women (n=364)			Sexual Difference
	Mean	SD	Min-max	Mean	SD	Min-max	
Liver Qi depression	11.1	(5.6)	0.0-27.7	11.8	(6.2)	0.0-29.8	p = 0.13
Liver fire flaming upward	16.6	(9.1)	0.0-41.7	17.1	(9.4)	0.0-45.8	p = 0.58
Intense heart fire	13.9	(9.0)	0.0-38.1	13.8	(8.8)	0.0-38.1	p = 0.91
Phlegm-fire harassing the heart	13.5	(7.0)	0.0-37.1	14.8	(7.8)	0.0-34.3	p = 0.04
Phlegm turbidity	14.7	(10.8)	0.0-46.2	15.3	(10.6)	0.0-53.8	p = 0.50
Phlegm clouding the pericardium	24.8	(15.2)	0.0-60.0	25.2	(13.9)	0.0-55.0	p = 0.78
Dual deficiency of the heart and spleen	19.6	(10.0)	0.0-50.0	22.5	(10.1)	0.0-47.6	p < 0.005
Liver yin deficiency	13.8	(7.5)	0.0-35.5	14.0	(7.3)	0.0-35.5	p = 0.75
Heart yin deficiency	17.1	(9.2)	0.0-39.0	17.2	(8.9)	0.0-39.0	p = 0.97
Kidney yin deficiency	11.4	(6.5)	0.0-27.8	11.4	(6.3)	0.0-30.6	p = 0.94

Table 3 Association between anxiety disorders and visceral patterns

Explanatory variable	Females		Males		
	Odds ratio (95% confidence interval)	p	Odds ratio (95% confidence interval)	p	
The whole Anxiety disorders	Liver Qi depression	0.94 (0.45 - 2.01)	0.88	0.37 (0.12 - 1.19)	0.09
	Liver fire flaming upward	0.97 (0.53 - 1.76)	0.92	1.27 (0.60 - 2.67)	0.53
	Intense heart fire	0.29 (0.14 - 0.61)	<0.01	0.81 (0.36 - 1.86)	0.62
	Phlegm turbidity	0.99 (0.63 - 1.57)	0.98	1.69 (0.96 - 2.97)	0.07
	Phlegm-fire harassing the heart	2.00 (0.96 - 4.14)	0.06	0.56 (0.20 - 1.58)	0.27
	Phlegm clouding the pericardium	0.59 (0.40 - 0.88)	<0.01	0.51 (0.32 - 0.82)	<0.01
	Dual deficiency of the heart and spleen	1.02 (0.60 - 1.74)	0.93	1.48 (0.68 - 3.25)	0.32
	Yin deficiency	0.43 (0.23 - 0.83)	0.01	0.56 (0.26 - 1.22)	0.15
	Liver yin deficiency	1.09 (0.45 - 2.64)	0.85	2.74 (0.88 - 8.54)	0.08
	Heart yin deficiency	6.14 (2.87 - 13.10)	<0.001	3.09 (1.29 - 7.40)	0.01
	Kidney yin deficiency	1.14 (0.52 - 2.51)	0.74	0.79 (0.28 - 2.26)	0.66
	Generalized Anxiety Disorder	Liver Qi depression	0.85 (0.30 - 2.39)	0.76	0.14 (0.03 - 0.74)
Liver fire flaming upward		1.07 (0.49 - 2.37)	0.86	1.01 (0.41 - 2.49)	0.99
Intense heart fire		0.44 (0.17 - 1.17)	0.10	1.55 (0.54 - 4.42)	0.41
Phlegm turbidity		1.35 (0.72 - 2.52)	0.34	1.61 (0.77 - 3.38)	0.21
Phlegm-fire harassing the heart		0.76 (0.27 - 2.10)	0.60	0.51 (0.13 - 1.90)	0.31
Phlegm clouding the pericardium		0.53 (0.31 - 0.90)	0.02	0.53 (0.28 - 0.98)	0.04
Dual deficiency of the heart and spleen		1.09 (0.53 - 2.24)	0.81	1.93 (0.67 - 5.58)	0.22
Yin deficiency		0.36 (0.15 - 0.83)	0.02	0.51 (0.18 - 1.47)	0.21
Liver yin deficiency		1.47 (0.46 - 4.70)	0.51	3.80 (0.82 - 17.56)	0.09
Heart yin deficiency		6.48 (2.52 - 16.62)	<0.001	2.43 (0.81 - 7.23)	0.11
Kidney yin deficiency		1.27 (0.46 - 3.50)	0.64	1.23 (0.31 - 4.95)	0.77
Panic disorder		Liver Qi depression	0.85 (0.25 - 2.88)	0.80	1.16 (0.14 - 9.72)
	Liver fire flaming upward	0.91 (0.36 - 2.31)	0.84	0.79 (0.20 - 3.19)	0.74
	Intense heart fire	0.25 (0.08 - 0.80)	0.02	0.47 (0.11 - 2.11)	0.33
	Phlegm turbidity	0.77 (0.38 - 1.57)	0.47	1.58 (0.54 - 4.64)	0.41
	Phlegm-fire harassing the heart	6.86 (2.26 - 20.78)	<0.001	0.37 (0.06 - 2.43)	0.30
	Phlegm clouding the pericardium	0.57 (0.30 - 1.07)	0.08	0.43 (0.17 - 1.04)	0.06
	Dual deficiency of the heart and spleen	1.04 (0.46 - 2.32)	0.93	1.29 (0.31 - 5.31)	0.73
	Yin deficiency	1.38 (0.52 - 3.65)	0.52	0.78 (0.20 - 3.05)	0.73
	Liver yin deficiency	0.71 (0.16 - 3.07)	0.64	5.80 (0.77 - 43.67)	0.09
	Heart yin deficiency	3.16 (1.06 - 9.41)	0.04	3.74 (0.87 - 16.02)	0.08
	Kidney yin deficiency	0.44 (0.12 - 1.60)	0.21	0.29 (0.03 - 2.38)	0.25

Table 4 Association between mood disorders and visceral patterns

Dependent variable	Explanatory variable	Females		Males	
		Odds ratio (95% confidence interval)	p	Odds ratio	p(95% confidence interval)
The whole mood disorders	Liver Qi depression	0.78 (0.41 - 1.47)	0.44	1.05 (0.43 - 2.55)	0.91
	Liver fire flaming upward	1.33 (0.80 - 2.22)	0.27	0.54 (0.28 - 1.03)	0.06
	Intense heart fire	0.99 (0.55 - 1.80)	0.98	1.00 (0.50 - 2.00)	0.99
	Phlegm turbidity	1.57 (1.05 - 2.36)	0.03	1.24 (0.77 - 2.00)	0.38
	Phlegm-fire harassing the heart	1.25 (0.66 - 2.39)	0.49	1.12 (0.46 - 2.73)	0.80
	Phlegm clouding the pericardium	1.23 (0.89 - 1.68)	0.21	0.98 (0.67 - 1.44)	0.93
	Dual deficiency of the heart and spleen	1.21 (0.77 - 1.90)	0.41	2.03 (1.04 - 3.96)	0.04
	Yin deficiency	0.78 (0.47 - 1.30)	0.34	0.81 (0.43 - 1.50)	0.49
	Liver yin deficiency	1.17 (0.58 - 2.39)	0.66	2.10 (0.82 - 5.37)	0.12
	Heart yin deficiency	1.23 (0.68 - 2.21)	0.50	0.95 (0.46 - 1.96)	0.89
	Kidney yin deficiency	1.14 (0.60 - 2.19)	0.69	1.66 (0.68 - 4.03)	0.27
	Major depression	Liver Qi depression	0.91 (0.44 - 1.89)	0.81	1.08 (0.36 - 3.27)
Liver fire flaming upward		1.47 (0.83 - 2.59)	0.19	0.39 (0.17 - 0.91)	0.03
Intense heart fire		0.80 (0.41 - 1.58)	0.52	1.35 (0.58 - 3.17)	0.49
Phlegm turbidity		1.43 (0.92 - 2.23)	0.11	1.09 (0.63 - 1.88)	0.75
Phlegm-fire harassing the heart		1.59 (0.79 - 3.21)	0.19	1.59 (0.52 - 4.84)	0.41
Phlegm clouding the pericardium		2.13 (1.48 - 3.05)	<0.001	1.99 (1.23 - 3.22)	<0.01
Dual deficiency of the heart and spleen		1.26 (0.77 - 2.08)	0.36	2.50 (1.13 - 5.56)	0.02
Yin deficiency		0.58 (0.33 - 1.04)	0.07	0.78 (0.37 - 1.64)	0.51
Liver yin deficiency		1.49 (0.69 - 3.24)	0.31	1.80 (0.57 - 5.66)	0.32
Heart yin deficiency		1.15 (0.60 - 2.21)	0.67	0.85 (0.35 - 2.04)	0.71
Kidney yin deficiency		0.94 (0.46 - 1.93)	0.86	1.83 (0.60 - 5.56)	0.29
Dysthymic disorder		Liver Qi depression	1.20 (0.34 - 4.17)	0.78	0.35 (0.03 - 3.72)
	Liver fire flaming upward	0.61 (0.22 - 1.69)	0.34	0.85 (0.21 - 3.39)	0.82
	Intense heart fire	0.53 (0.18 - 1.59)	0.26	1.16 (0.22 - 6.00)	0.86
	Phlegm turbidity	1.41 (0.74 - 2.68)	0.30	1.63 (0.59 - 4.50)	0.35
	Phlegm-fire harassing the heart	3.71 (1.14 - 12.02)	0.03	1.72 (0.24 - 12.38)	0.59
	Phlegm clouding the pericardium	1.25 (0.68 - 2.29)	0.47	0.91 (0.36 - 2.29)	0.84
	Dual deficiency of the heart and spleen	0.44 (0.19 - 1.04)	0.06	1.10 (0.18 - 6.61)	0.92
	Yin deficiency	2.09 (0.73 - 5.96)	0.17	0.91 (0.19 - 4.41)	0.90
	Liver yin deficiency	1.12 (0.29 - 4.34)	0.87	0.43 (0.03 - 5.81)	0.53
	Heart yin deficiency	2.27 (0.72 - 7.14)	0.16	1.04 (0.13 - 8.05)	0.97
	Kidney yin deficiency	0.31 (0.08 - 1.20)	0.09	6.62 (0.89 - 49.11)	0.06
	Depressive disorder not otherwise specified	Liver Qi depression	0.97 (0.39 - 2.40)	0.94	1.39 (0.39 - 4.95)
Liver fire flaming upward		1.04 (0.52 - 2.11)	0.90	0.95 (0.39 - 2.31)	0.91
Intense heart fire		1.05 (0.44 - 2.50)	0.91	0.54 (0.19 - 1.52)	0.24
Phlegm turbidity		1.31 (0.71 - 2.42)	0.38	1.07 (0.52 - 2.20)	0.86
Phlegm-fire harassing the heart		0.57 (0.21 - 1.56)	0.27	1.06 (0.28 - 3.95)	0.93
Phlegm clouding the pericardium		0.35 (0.21 - 0.59)	<0.001	0.31 (0.16 - 0.61)	<0.001
Dual deficiency of the heart and spleen		1.18 (0.60 - 2.33)	0.63	1.19 (0.45 - 3.16)	0.73
Yin deficiency		1.08 (0.53 - 2.18)	0.84	0.95 (0.38 - 2.38)	0.92
Liver yin deficiency		0.86 (0.30 - 2.45)	0.77	2.52 (0.68 - 9.42)	0.17
Heart yin deficiency		1.86 (0.79 - 4.42)	0.16	1.31 (0.44 - 3.95)	0.63
Kidney yin deficiency		1.40 (0.55 - 3.55)	0.48	0.82 (0.23 - 2.90)	0.75

Table 5 Associations between visceral patterns and psychological questionnaire scores in females (a) and males (b)

(a)

Explanatory Variable	Dependent Variable					
	State Anxiety Assessed By STAI-I		Trait Anxiety Assessed By STAI-II		SDS	
	Odds ratio (95% confidence interval) p		Odds ratio (95% confidence interval) p		Odds ratio (95% confidence interval) p	
Liver Qi depression	17.64 (1.21 - 254.68)	0.04	17.29 (1.19 - 254.68)	0.04	8.08 (1.01 - 64.72)	0.05
Liver fire flaming upward	0.42 (0.05 - 3.53)	0.43	24.29 (2.92 - 200.34)	<0.01	0.91 (0.16 - 5.26)	0.92
Intense heart fire	0.13 (0.01 - 1.57)	0.11	0.70 (0.05 - 9.12)	0.79	1.01 (0.14 - 7.10)	0.99
Phlegm turbidity	1.17 (0.23 - 5.99)	0.84	1.14 (0.22 - 5.81)	0.88	0.57 (0.16 - 2.03)	0.39
Phlegm-fire harassing the heart	5.10 (0.34 - 76.71)	0.24	0.02 (0.00 - 0.34)	<0.01	5.00 (0.57 - 44.26)	0.15
Phlegm clouding the pericardium	2.05 (0.53 - 8.00)	0.30	9.03 (2.27 - 35.52)	<0.01	11.02 (3.82 - 31.50)	<0.001
Dual deficiency of the heart and spleen	2.51 (0.37 - 16.95)	0.35	5.81 (0.83 - 40.85)	0.08	4.44 (1.00 - 19.69)	0.05
Yin deficiency	0.15 (0.02 - 1.32)	0.09	0.04 (0.00 - 0.32)	<0.01	0.95 (0.17 - 5.31)	0.95
Liver yin deficiency	2.14 (0.10 - 44.26)	0.62	1.04 (0.05 - 22.65)	0.98	0.41 (0.04 - 4.22)	0.46
Heart yin deficiency	473.43 (40.04 - 5653.33)	<0.001	219.20 (16.61 - 2921.93)	<0.001	19.89 (2.72 - 144.03)	<0.01
Kidney yin deficiency	0.91 (0.06 - 13.74)	0.95	0.08 (0.01 - 1.28)	0.07	0.72 (0.09 - 5.93)	0.76

(b)

Explanatory Variable	Dependent Variable					
	State Anxiety Assessed By STAI-I		Trait Anxiety Assessed By STAI-II		SDS	
	Odds Ratio (95% Confidence Interval) P		Odds Ratio (95% Confidence Interval) P		Odds Ratio (95% Confidence Interval) P	
Liver Qi depression	2.83 (0.05 - 170.72)	0.62	0.46 (0.01 - 25.28)	0.70	0.96 (0.04 - 22.20)	0.98
Liver fire flaming upward	0.33 (0.02 - 6.89)	0.48	0.42 (0.02 - 8.58)	0.57	0.45 (0.04 - 4.66)	0.50
Intense heart fire	1.27 (0.05 - 30.57)	0.88	2.36 (0.11 - 52.46)	0.59	5.37 (0.46 - 62.80)	0.18
Phlegm turbidity	1.52 (0.18 - 13.07)	0.70	0.49 (0.06 - 4.18)	0.51	1.54 (0.30 - 7.85)	0.60
Phlegm-fire harassing the heart	0.17 (0.00 - 9.68)	0.39	0.12 (0.00 - 5.70)	0.28	1.02 (0.05 - 22.42)	0.99
Phlegm clouding the pericardium	6.69 (1.12 - 39.65)	0.04	46.06 (7.85 - 267.74)	<0.001	16.61 (4.18 - 66.02)	<0.001
Dual deficiency of the heart and spleen	5.26 (0.23 - 120.30)	0.30	6.17 (0.28 - 137.00)	0.25	14.15 (1.42 - 141.17)	0.02
Yin deficiency	0.28 (0.01 - 5.16)	0.39	0.02 (0.00 - 0.37)	<0.01	0.58 (0.06 - 5.53)	0.64
Liver yin deficiency	6.49 (0.09 - 478.19)	0.39	25.53 (0.35 - 1881.83)	0.14	3.53 (0.14 - 90.02)	0.45
Heart yin deficiency	26.31 (0.82 - 854.06)	0.06	4.85 (0.16 - 144.03)	0.36	0.54 (0.04 - 7.17)	0.64
Kidney yin deficiency	5.53 (0.09 - 323.76)	0.41	164.02 (3.16 - 8518.54)	0.01	2.36 (0.11 - 52.98)	0.59

Liver Qi depression and heart yin deficiency were significantly associated with high levels of state anxiety in females. However, phlegm clouding the pericardium was associated with state anxiety in males.

The patterns observed in patients with trait anxiety were different from those in state anxiety. Liver fire flaming upward and phlegm clouding the pericardium, as well as liver Qi depression and heart yin deficiency, were significantly associated with trait anxiety in females, although phlegm-fire harassing the heart was inversely associated. In males, kidney yin deficiency, as well as phlegm clouding the pericardium was significantly associated with trait anxiety.

Depressive state was significantly associated with phlegm clouding the pericardium in both sexes, as well as heart yin deficiency in females and dual deficiency of the heart and spleen in males.

The limitations of the present study

One limitation of the present study is that pulse, tongue and abdominal examinations were not conducted. Since no standard scoring system for traditional Chinese medicine is available, for the present study, the extent of each pattern had to be tentatively based on the assessment of the questionnaires. Since the subjects were patients at a tertiary medical care center, the results cannot be generalized.

However, the large number of the participants with more severe and typical disorders at this center enabled demonstration of many significant associations between relatively rare disorders and patterns.

Discussion on the patterns in anxiety disorders

In order to treat anxiety disorders, the heart meridian, is used frequently because it possesses many tranquilizing points. In this study, heart yin deficiency was significantly associated with generalized anxiety disorder, while intense heart fire was inversely associated with the disorder in females. These results indicate that deficiency pattern of the heart, and not excess pattern, is associated with generalized anxiety disorder. However, an excess pattern of the heart, intense heart fire, as well as a deficiency pattern, is significantly associated with panic disorder in females. This result coincides with the clinical impression that sticky slimy fur is often observed in patients with panic disorder. Therefore, generalized anxiety disorder is considered more deficient than panic disorder. Heart yin deficiency was also significantly associated with panic disorder, but not significantly associated with hyperventilation syndrome. Since hyperventilation is no more than one of the 13 symptoms or panic disorder, it is supposed that many cases of panic disorder are without hyperventilation. These results indicate that panic disorder is a broader disorder than hyperventilation syndrome.

The observation that yin deficiency was inversely associated with generalized anxiety disorder initially appears to be inconsistent with the significant association between this disorder and heart yin deficiency. Since heart yin deficiency is a mixed pattern comprised of heart disease and yin deficiency, the results are proposed to reflect the association between generalized anxiety disorder and heart disease, rather than yin deficiency.

Discussion on the patterns in questionnaire-assessed anxiety

The association between the extent of anxiety assessed by the STAI and the patterns was slightly different from the association between anxiety disorders and the patterns. In addition to heart yin deficiency, which was significantly associated with generalized anxiety disorder and panic disorder in females, liver Qi depression and liver fire flaming upward in females, as well as phlegm clouding the pericardium in both sexes, were significantly associated with anxiety. Remarkably, the associations were relatively strong, and nearly all of the ORs were greater than 10, although, in the present study, anxiety itself was not included in the criteria for the associated patterns, except for dual deficiency of the heart and spleen.

In females, liver Qi depression was significantly associated with STAI-I scores, which indicate state anxiety. This result suggests that this pattern is characteristic of static anxiety. However, liver fire flaming upward in females and phlegm clouding the pericardium were significantly associated with STAI-II scores, which indicate trait anxiety. Trait anxiety means tendency to get anxious, which sometimes underlies anger. This is consistent with that liver fire flaming upward is more dynamic than liver Qi depression and characteristic of abrupt anger. If liver Qi depression or liver fire flaming upward persists for a long period of time, and yin deficiency arises due to blood deficiency, generalized anxiety disorder or panic disorder would be developed. In the present study, these disorders were suggested to be associated with a form of yin deficiency.

In females, phlegm clouding the pericardium was significantly associated with trait anxiety, but not with state anxiety. This result is consistent with the properties of phlegm or retained fluid. Ultimately, the retained fluid that is associated with the kidney abruptly rises up, causing sudden chest pain and dyspnea with anxiety, known as running piglet symptoms. The result is consistent with some of Kampo recipes for anxiety, such as ryokeijutsukanto, ryokeikansoto, syohangekabukuryoto, hontonto and hangebyakujutsutenmato containing galenicals resolving dampness.

Heart yin deficiency in females was significantly associated with the STAI-I and STAI-II scores. This is consistent with that heart points, such as HT5, HT7 and PC5 are effective for anxiety.

Finally, kidney yin deficiency in males was significantly associated with high trait anxiety. This result is consistent with a previous report that confirmed that a high score for trait anxiety correlates to the habituation of an inadequate respiration thoracic pattern,¹¹ since kidney has a function in Qi absorption and assists inspiration according to traditional Chinese theory. However, this pattern was not significantly associated with any disorder. There could be several explanations regarding this lack of association. First, in our unpublished study that assessed the association between autonomic dysfunction and visceral patterns, kidney pattern was accompanied by slight dysfunction, which cannot be detected by a simple increase or decrease in heart rate variability but requires complex analyses, taking

into account fractal dimensions. This is consistent with the traditional Chinese theory that the kidney is an organ that is rich in Qi and poor in blood, which indicates that kidney pattern is more superficial than the patterns of other viscera that are rich of blood, such as the heart and liver. The Qi patterns are called “disease transmitted by meridian” and too superficial to result in apparent disorders in contrast to blood patterns what is called “disease produced by viscous and result from Qi patterns.”

This study revealed sexual differences in the patterns associated with trait anxiety. Trait anxiety related to kidney yin deficiency in males and liver fire flaming upward in females. These are consistent with the previous reports on sexual differences in patterns.^{12,13} Ishikawa et al. have reported that liver patterns were significantly more prevalent in female patients with shoulder stiffness than in male patients with it. Suzuki has reported that age-related increase in kidney patterns and age-related decrease in liver patterns were observed in only male patients.¹²

Discussion on the patterns in mood disorders

It was suggested that phlegm clouding the pericardium was associated with depression in both sexes. On the other hand, phlegm-fire harassing the heart was significantly associated with dysthymic disorder in females. These patterns are both the terminal stage of phlegm-related patterns originating from phlegm turbidity and conflict with each other. Therefore, it is supposed that depression and dysthymic disorder are different results from phlegm turbidity, and vitality still remains in dysthymic disorder in contrast to progressive depression. In fact, dysthymic disorder lacks loss of interest and psychomotor inhibition, which are characteristic of depression although it has some symptoms in common with depression.

In males, both phlegm clouding the pericardium and dual deficiency of the heart and spleen were significantly associated with depression. Different diagnosis between an excess and a deficiency patterns would be necessary in males with depression.

Discussion on the patterns in depressive state assessed by a questionnaire

It was demonstrated that phlegm clouding the pericardium in both sexes, and dual deficiency of the heart and spleen in males were associated with the SDS-assessed depressive state. These results are consistent with the association between the diagnosis of depression and patterns, as mentioned previously. In addition, heart yin deficiency in females, which was not significantly associated with diagnosis of depression, was significantly associated with high SDS scores. SDS includes impatience and palpitation, which are characteristics of both agitated depression and heart pattern. Therefore, this result may reflect subclinical depressive state which might result in agitated depression with progress.

The critical findings of the present study

Figure 1 emphasizes the critical findings of the present study. Wider array of patterns were associated with anxiety states, which varied between males and females, than generalized anxiety disorder, which derived from only a deficiency pattern. On the other hand, panic disorder derived from both excess and deficiency patterns. Concerning mood disorders, the pattern observed in dysthymic disorder was solely excessive and different from those associated with depressive state and diagnosis of depression, which derived from both excess and deficiency patterns.\

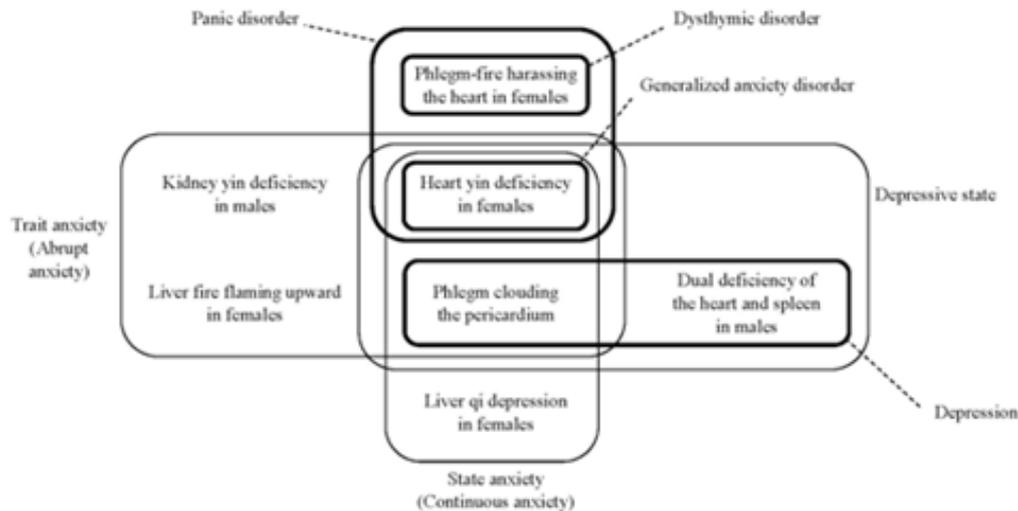


Figure 1 critical point of the present study is shown.

The patterns enclosed by thick lines are significantly associated with the corresponding disorders, while the patterns enclosed by thin lines are significantly associated with the corresponding psychological status.

Conclusion

A detailed investigation on a large number of patients regarding the visceral patterns that are associated with psychiatric disorders could reveal the pattern variations that occur between psychological status and the corresponding disorders. In addition, sex should be taken into account, as the patterns observed vary between males and females.

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Conflicts of interest

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