

Evaluation of Medical Students Using the “qi, blood, and fluid” System of Kampo Medicine

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Objective: Although “qi, blood, and fluid” (QBF) is the most important concept for patients in Kampo medicine, there are few studies about the conditions of the QBF system among healthy populations. We used QBF pattern scores to determine whether or not medical students, presumed to be healthy, had any potentially pathological conditions.

Methods: Six consecutive fourth-year classes totaling 652 medical students evaluated their own QBF conditions using Terasawa’s QBF pattern scores. The six conditions: “qi deficiency” (QD), “qi stagnation” (QS), “qi counterflow” (QC), “blood deficiency” (BD), “blood stasis” (BS), and “fluid disturbance” (FD), were categorized according to Terasawa’s criteria. The Mann-Whitney U test was used to compare the score differences between the genders, Chi-square test was used to examine gender differences in the QBF diagnoses, and the Spearman’s rank-order correlation coefficient analysis was used to analyze the correlation between each category of QBF.

Results: In all, 44.6% of the students met at least one diagnostic criterion in the QBF system. QC, BD, BS, and FD were established more in females, and QD and QS were established without gender differences.

Conclusions: Most students who were presumed to be healthy were revealed to have some potentially pathological conditions using the QBF system.

Key words: Kampo medicine, “qi, blood, and fluid,” QBF system, QBF pattern score, medical student

INTRODUCTION

In traditional Japanese Kampo medicine, it is believed that the human body is constructed of the three major elements, “qi, blood, and fluid” (QBF), and that the appropriate amounts of them flow through the whole body without stagnation in a healthy person. However, a pathogenic condition of the QBF system can cause various physical and/or psychological symptoms [1]. Even though the QBF concept is one of the most important approaches to the patients’ conditions in Kampo medicine, there are relatively few studies about the QBF diseases and disorders in presumably healthy populations. The aim of the present study was to determine whether medical students presumed to be healthy have any potential diseases and/or disorders that could be revealed by their QBF conditions.

PARTICIPANTS AND METHODS

A total of 652 students (407 males and 245 females), aged 21-51 years (mean, 25.2 ± 19.8 years), who attended their fourth year at Tokai University School of Medicine, in 2007 to 2012, were analyzed in this study with their verbal informed consent. By gender, males aged 21-51 years (mean, 25.4 ± 21.2 years), and females aged 21-49 years (mean 25.0 ± 19.8 years). During the 9-hour Kampo lecture course annually

delivered in 2007 to 2012, we provided the same contents including the two basic concepts, QBF and the “deficiency-excess pattern,” as the focal points of our lecture series and experienced-based learning sessions as the most important basic concepts of Kampo medicine [2]. For the experienced-based learning sessions, all of the fourth-year students were divided into nine groups (12-14 students per group) for a 3-hour experienced-based learning course consisting of a 1-hour session for each of three subjects: Kampo medicine, acupuncture and moxibustion, and crude drugs [3]. For the Kampo medicine training, the students self-evaluated the condition of their own QBF system using the QBF pattern scores of Terasawa, *et al.* [4, 5] to clinically use the knowledge and information they gained from lectures and examinations. With the direction and observation of an instructor, the students used the basic examination methods of Kampo medicine, the “tongue examination,” “pulse examination,” and “abdominal examination,” required to calculate the scores. Participants answered all the questions in the examinations by themselves using the QBF pattern scores.

The QBF pattern scoring system is an objective method to evaluate patients’ conditions regarding the three major elements, qi, blood, and fluid, which make up the human body and spirit. The scores are

composed of six categories: “qi deficiency” (QD), “qi stagnation” (QS), and “qi counterflow” (QC), the three imbalances of the “qi;” “blood deficiency” (BD) and “blood stasis” (BS), those of the “blood;” and “fluid disturbance” (FD), that of the “fluid.” In each category, the score is composed of 12–18 questions concerning subjective symptoms and bodily signs, for a total of 90–102 points [5]. A total score of more than 30 points each for QD (of 102 possible points), QS (of 100), QC (of 100), and BD (of 100), as well as a total BS score of more than 20 points (of 90 in males and 101 in females) and an FD score of more than 13 points (of 100) was considered to be significant.

For statistical analyses, the Mann-Whitney U test was used to compare the differences in scores between the genders, the Chi-square test was applied to examine gender differences in the QBF diagnoses, and the Spearman’s rank-order correlation coefficient with Bonferroni adjustment analysis was used to analyze the correlation between each category of QBF.

RESULTS

There were no significant differences in age between the genders of the 652 students in the present study. The mean QD score was 18.3 ± 13.3 in male students and 22.0 ± 14.3 in female students, that of QS was 14.3 ± 14.3 and 16.5 ± 14.0 , QC was 10.7 ± 11.3 and 23.0 ± 14.1 , BD was 14.4 ± 13.1 , and 23.1 ± 15.2 , BS was 4.5 ± 6.3 and 10.8 ± 10.0 , and FD was 7.7 ± 8.5 and 16.7 ± 11.7 , for male and female students respectively, showing a significantly higher rate of all QBF pattern scores in females than those of males ($p < 0.01$, respectively). According to the diagnostic criteria of each category, QD was established in 21.1% in males and 26.5% in females, QS in 14.0% and 15.1%, QC in 6.6% and 28.1%, BD in 12.3% and 31.0%, BS in 2.5% and 15.5%, and FD in 20.6% and 56.7% of all students, male and female, respectively. These results showed a significantly higher rate of QC, BD, BS, and FD ($p < 0.01$ for all) in females and no gender differences in QD and QS (Fig. 1).

The total number of diseases and/or disorders established in each student was an mean of 0.77 ± 1.23 in males and 1.72 ± 1.46 in females; and 53.4% of all the students met no QBF diagnostic criteria (60.2%, males; 24.1%, females). The rate of the students who met only one QBF diagnostic criteria was 21.6% in males and 26.9% in females; two, 7.1% and 20.0%; three, 5.2% and 15.9%; four, 4.2% and 9.0%; five, 1.5% and 2.9%; all six, 0.2% and 1.2%, in males and females, respectively. Of all the students, 18.2% of the males and 49.0% of the females met more than two QBF diagnostic criteria (Fig. 2).

Regarding the correlation between two categories of QBF pattern scores, in males, no significant correlations were observed between BS and QC, and BS and FD; while positive correlations were observed between BS and QD ($p < 0.05$), and in the other two categories ($p < 0.01$). In females, no significant correlation was observed between FD and QD, while positive correlations were observed between BS and FD ($p < 0.05$), and in the other two categories ($p < 0.01$) (Table).

DISCUSSION

When making a diagnosis in Kampo medicine, it is important to listen to the patients’ complaints, and to detect signs and symptoms, both somatic and psychic. This kind of information is difficult to quantify, and the objective description is not easy, unlike laboratory and imaging data so prevalent in Western medicine. Thus, Kampo education for clinical purposes is exceedingly difficult, so that its contents and methodologies vary among the 80 Japanese medical schools [6]. QBF pattern scoring may be useful in the context of clinical Kampo education, because it enables students to objectively evaluate patients’ conditions from the viewpoint of the QBF concept.

The diseases and disorders of QBF and their particular relevant clinical symptoms are also deeply related. The word “qi” means energy, spirit, and is often referred to as air, gas, vapor, or the breath in the modern sense. QD is an inactive or low-spirited condition, which concurrently entails digestive dysfunction, meaning that the patient’s “qi” is not sufficient enough to sustain his or her mental and bodily functions to live. In this condition, for example, fatigue, drowsiness, or appetite loss is often seen. QS is the condition in which circulation of “qi” as spirit and gas, is disturbed, and many patients complain of a depressive mood, a sensation of difficulty in breathing or of a foreign body sensation in the throat, or a gas retention-associated feeling in the stomach and colon. QC is the condition in which “qi” as energy and spirits rises up to the upper half of the body, and the patient experiences hot flushes, with a red flushed face and cold feet, frequently associated with irritation and palpitation. In contrast to the “qi” concept, “blood” and “fluid” are more materialistic and much closer to the concepts of blood and body fluids in Western terms [7]. BD not only appears as anemia but also represents poor nutritional and circulatory conditions. The patient has dry skin apt to atrophy, white and thin hair apt to fall out, and limbs that become lean enough that the tendons and joints can be easily distinguished. BS stands for blood stagnation: specifically, for stagnation of the venous system and capillary vascular system for which images can be taken. BS commonly occurs perimenstruatively and during delivery, puerperium, and climacterium. Inflammation, bruises, hemorrhoids, and varicities can also be included in BS. FD shows a wide range of pathological conditions related to fluid, including edema, dizziness, rhinorrhea or headache before a rain [8].

Some studies using the QBF pattern scores have been reported. In one study of 899 climacteric women with undefined complaints, BS was found to be the most frequent condition [9]. Especially, in that study, in those women with headache, hot flushes, and dizziness as their principal menopausal symptoms, FD, BS, and FD were the most frequent respective conditions [9]. In another study, in 134 patients with vertigo, FD showed the highest positive rate of the six categories [10]. In yet another study, obese subjects, as determined by body mass index, exhibited QS and FD conditions; and the visceral fat-rich subjects were diagnosed by means of abdominal ultrasonography and

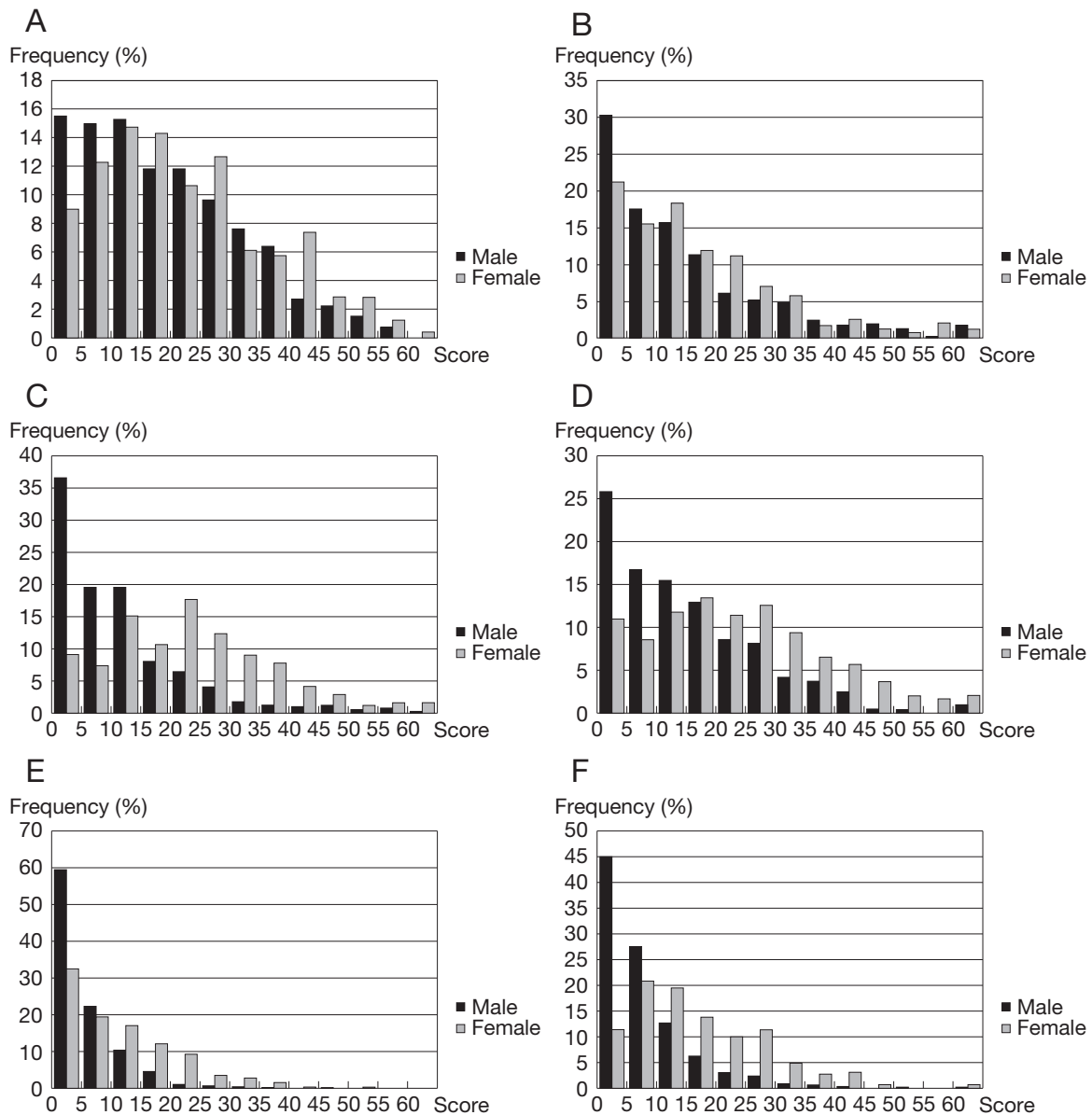


Fig. 1 Total QBF scores
A. Total QD scores
 Males: mean, 18.3 ± 13.3 ; median, 17 of 102; females: mean, 22.0 ± 14.3 ; median, 19 of 102
 Mann-Whitney U test: males, $n = 407$; females, $n = 245$; $p < 0.01$
 Diagnosis of QD, ≥ 30 : males, 21.1%; females, 26.5%
B. Total QS scores
 Males: mean, 14.3 ± 14.3 ; median, 11 of 100; females: mean, 16.5 ± 14.0 ; median, 13 of 100
 Mann-Whitney U test: males, $n = 407$; females, $n = 245$; $p < 0.01$
 Diagnosis of QS, ≥ 30 : males, 14.0%; females, 15.1%
C. Total QC scores
 Males: mean, 10.7 ± 11.3 ; median, 8 of 100; females: mean, 23.0 ± 14.1 ; median, 22 of 100
 Mann-Whitney U test: males, $n = 407$; females, $n = 245$; $p < 0.01$
 Diagnosis of QC, ≥ 30 : males, 6.6%; females, 28.1%
D. Total BD scores
 Males: mean, 14.4 ± 13.1 ; median, 12 of 100; females: mean, 23.1 ± 15.2 ; median, 21 of 100
 Mann-Whitney U test: males, $n = 407$; females, $n = 245$; $p < 0.01$
 Diagnosis of BD, ≥ 30 : males, 12.3%; females, 31.0%
E. Total BS scores
 Males: mean, 4.5 ± 6.3 ; median, 2.5 of 90; females: mean, 10.8 ± 10.0 ; median, 8.5 of 101
 Mann-Whitney U test: males, $n = 407$; females, $n = 245$; $p < 0.01$
 Diagnosis of BS, ≥ 21 : males, 2.5%; females, 15.5%; ≥ 40 for severe BS: males, 0.2%; females, 1.2%
F. Total FD scores
 Males: mean, 7.7 ± 8.5 ; median, 5 of 100; females: mean, 16.7 ± 11.7 ; Median, 14 of 100
 Mann-Whitney U test: males, $n = 407$; females, $n = 245$; $p < 0.01$
 Diagnosis of FD, ≥ 13 : males, 20.6%; females, 56.7%

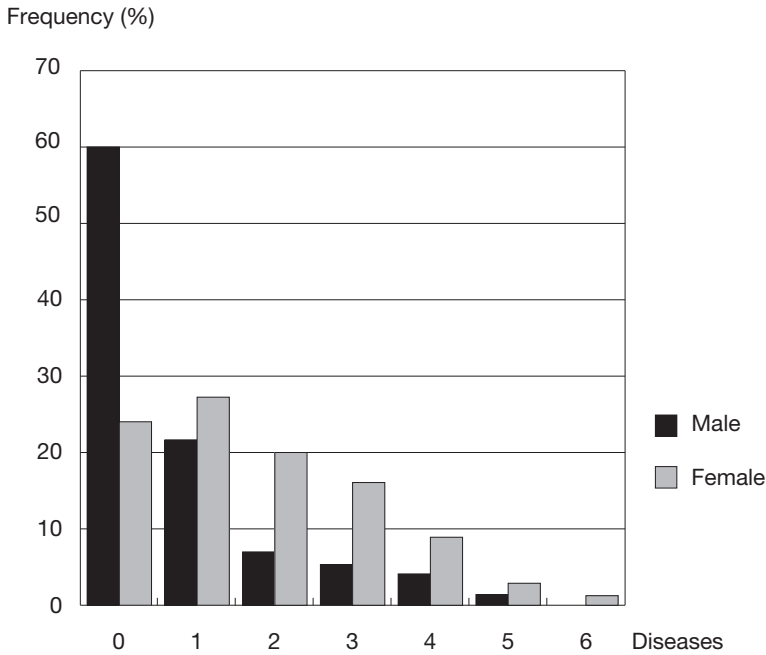


Fig. 2 The number of diseases established in each student

Table The correlation between two categories of QBF pattern scores (p value)

		Female					
		QD	QS	QC	BD	BS	FD
Male	QD	0.000	0.000	0.000	0.000	0.001	0.099
	QS	0.000	0.000	0.000	0.000	0.001	0.000
	QC	0.000	0.000	0.000	0.000	0.000	0.000
	BD	0.000	0.000	0.000	0.000	0.000	0.000
	BS	0.013	0.000	0.832	0.000	0.000	0.030
	FD	0.000	0.000	0.000	0.000	0.062	0.000

The Spearman’s rank-order correlation coefficient with Bonferroni adjustment analysis

revealed a BS state [11]. Moreover, in 488 patients with Sjögren’s syndrome, and its related collagen diseases, BS was a more dominant condition than any other QBF category [12]. There are certain signs and symptoms, diseases and disorders that are closely associated with disorders of the QBF system.

Disorders of QBF, however, may be found without the onset of what could potentially be symptoms troublesome to performing daily life activities. This stage is called, “mibyō,” i.e., a latent stage of disease, in Kampo medicine, and may help to anticipate a future onset of disease [13]. For example, young people with high BD scores might feel general fatigue and cold in the extremities in the future. In the present study, medical students who were presumed to be healthy were also diagnosed as having QD by 21.1% and 26.5%, QS by 14.0% and 15.1%, QC by 6.6% and 28.1%, BD by 12.3% and 31.0%, BS by 2.5% and 15.5%, and FD by 20.6% and 56.7%, males and females, respectively. The previous study reported that 60 adults without diseases revealed by Western medicine, aged 20–49 years, diagnosed with QD by 27%, QS by 7%, QC by 23%, BD by 22%, BS by 65%, and FD by 63%, respectively [14]. Compared with the Kawakami *et al.* [14] study in which the ages of the participants were similar, a higher percentage of QS scores and a lower

percentage of BS and FD scores were observed in the present study. The higher percentage of QS suggests that medical students are suffering from a lot of stress, the lower percentage of BS may be caused by the immaturity of the Kampo diagnostic procedure, such as the “abdominal examination,” that is included in the QBF pattern score. However, it is difficult to consider that the results of the previous report, showing that the adults presumably without diseases and/or disorders, revealed remarkably high percentages of BS and FD, which, in turn, correctly indicated their clinical conditions. Further studies, including the examinations about the validity of questionnaires of QBF pattern scores, are warranted.

Regarding gender, significantly higher rates of all QBF pattern scores in females than those in males suggests that potential imbalance of physical and mental conditions is more common in female students. While most QBF diseases and disorders are more common in females, the results that QD and QS is relatively common in males are similar to those of a previous study that involved a population-based survey in Hase village, Nagano, which revealed that BD and FD affected younger females, while QD primarily affected younger males [15]. These results suggest that males are weaker against stress than are females.

In the present study, the students who met no QBF diagnostic criteria were 60.2% in males and 24.1% in females, while 18.2% of the males and 49.0% of the females met more than two QBF diagnostic criteria. These results suggest that when physical balance collapses, the diseases and disorders of the QBF conditions cause the imbalance of multiple QBF categories simultaneously and do not stay in just one category. In fact, significant positive correlations were observed between two categories of QBF pattern scores other than in BS and FD, and BS and QC in males, and FD and QC in females. In males, considering that relatively few correlations were observed between BS and other categories, it was suggested that the BS imbalance occurred independently of other categories.

A limitation of this study is that the students fill out the scores on their own, which proves to be an information bias because most of the criteria are rather subjective. Moreover, it was the first time most of these students experienced the basic examination methods of Kampo medicine, i.e., the “tongue examination,” “pulse examination,” and “abdominal examination,” required to calculate the scores. Therefore, this also proves to be an information bias because these methods, to reveal accurate diagnoses, require considerable training.

We evaluated the QBF conditions in medical students presumed to be healthy and discovered that 46.6% of the students met the disease diagnostic criteria in the QBF system. However, these students may not require Kampo treatment because the aim of Kampo therapy is primarily to alleviate symptoms. Using the QBF pattern scores, predictions can be made for subjects of certain symptoms that may most likely occur in them in the future even though there are no symptoms currently manifested. Further prospective studies on the future likely appearance of distinctive symptoms in subjects who currently have potential QBF disorders are warranted. With these prognostic diagnoses, patients who start taking Kampo medicine regularly may avoid the onset of serious diseases.

CONCLUSIONS

Using Terasawa’s QBF pattern scores, we found QBF disorder conditions in most of the medical students who were presumed to be healthy. Further, prospective studies are warranted to examine the future possibility of the distinctive symptoms in patients who currently have potential QBF disorders.

COMPETING INTERESTS

We have no competing financial or non-financial interests in this study; however, the Department of Oriental Medicine, Tokai University School of

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