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ORIGINAL ARTICLE

Body constitutions of traditional Chinese medicine caused a significant effect on irritable bowel syndrome

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Abstract

Background: According to the theory of traditional Chinese medicine (TCM), all types of body constitutions, except for the Gentleness (ie, the control group in our study), have disease susceptibility and affect the disease development process. This study attempted to investigate the relationship between TCM body constitutions and irritable bowel syndrome (IBS).

Methods: This cross-sectional study was based on Taiwan Biobank (TWB) and collected clinical data from 13 941 subjects aged 30 to 70. The results of the study showed that subjects with Yang-deficiency (N = 3161 subjects, odds ratio [OR] = 2.654, 95% CI = 1.740-3.910), Ying-deficiency (N = 3331 subjects, OR = 1.096, 95% CI = 0.627-1.782) or Stasis (N = 2335 subjects, OR = 1.680, 95% CI = 0.654-3.520) were more likely to have IBS.

Results: If the subjects with two or more TCM body constitutions: Yang-deficiency + Ying-deficiency (OR = 3.948, 95% CI = 2.742–5.560), Yang-deficiency + Stasis (OR = 2.312, 95% CI = 1.170-4.112), Ying-deficiency + Stasis (OR = 1.851, 95% CI = 0.828-3.567), or Yang-deficiency + Ying-deficiency + Stasis (OR = 3.826, 95% CI = 2.954-4.932) were also prone to IBS.

Conclusion: These results confirmed the high correlation between TCM body constitutions and IBS. Because the current treatment for IBS is not entirely satisfactory, integrated traditional Chinese and Western medicine might provide patients with an alternative treatment option to alleviate IBS.

Keywords: Body constitution; Irritable bowel syndrome; Taiwan Biobank; Traditional Chinese medicine

1. INTRODUCTION

Irritable bowel syndrome (IBS) is a gastrointestinal tract disease characterized by recurrent abdominal pain or gastrointestinal discomfort combined with changes in the frequency of bowel movements or changes in the shape of stools.[1] In addition to gastrointestinal symptoms, IBS often occurs in combination with other symptoms such as dizziness, headache, noncardiac chest pain, back pain, chronic fatigue syndrome, fibromyalgia, painful intercourse, frequent urination, major depression, anxiety, and somatization disorder.[2] IBS is the most common clinical gastrointestinal disorder, accounting for about 15% of the population in Western countries and about 20% of the population in China.[3] Although not all patients with IBS seek medical help, IBS patients make up a large percentage of gastroenterology or other medical visits.[4] In the United States, the annual medical costs associated with IBS are estimated to exceed $1 billion directly.[5]

The etiology of IBS remains uncertain.[6] Despite numerous studies, they have been contradictory, and no abnormalities specific to this disease have been identified. In the past, the focus of IBS had been on the altered dynamics of the gastrointestinal tract and the hypersensitivity of the visceral organs.[7,8]

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Nowadays, many studies link IBS to inflammatory responses, changes in fecal flora, bacterial overgrowth, and gut–brain interactions.[9–12] The role of food sensitivities needs to be considered, and the presence of a genetic predisposition is also being investigated.[13,14] Treatment for IBS includes lifestyle changes, dietary changes, and medication.[15] Dietary changes include eliminating off-gassing foods and avoiding lactose and gluten.[16–18] However, for patients with IBS who have limited success with lifestyle and dietary changes, gastroenterologists recommend medication.[1] For patients with constipation, gastroenterologists use osmotic laxatives; patients with abdominal pain are prescribed antispasmodic agents; and patients with known stressors are treated with antidepressants.[19–21] For patients with diarrhea, gastroenterologists prescribe antidiarrheal medications.[22] Although several options exist to treat IBS, the results are not satisfactory for all patients. According to one study, nearly 43% of patients with IBS have an unmet need for treatment.[23] As a result, more and more patients are seeking alternative therapies, such as traditional Chinese medicine (TCM), to treat IBS symptoms.[24,25] Several articles have been published on the treatment of IBS in TCM.[26–28]

At the same time, many studies examine the differences in TCM body constitution between individuals, suggesting that doctors need to use different treatment modalities depending on the individual's TCM body constitution.[29–31] According to a study on the theory of body constitution in TCM, the body constitution of a person is related to gender, age, mental state, and living environment, which in turn determines the susceptibility to disease and the course of disease development.[32] The theory of body constitution in TCM originates from the Yellow Emperor's Canon of Medicine, written more than 2000 years ago. It summarized the characteristics of the patient's whole body and the imbalance of the body and mind from the Ying-Yang, Exterior-Interior, Cold-Heat, and Deficiency- Excess of the disease and the patient's Qi, Blood, Body Fluids, and Internal Organs.[32] TCM body constitution emphasizes the specificity and individuality of each patient. Therefore, treating diseases in TCM is not only to alleviate the discomfort caused by symptoms but also to restore the balance and harmony of the patient's overall physical and psychological condition.[29,31,33] This study was based on the Body Constitutions Questionnaire (BCQ) and the Taiwan Biobank (TWB). BCQ could determine the physical and psychological deviations of each patient in the past month and assess whether the patient has the TCM body constitution of Yang-deficiency (BCQ+), Ying-deficiency (BCQ–), Stasis (BCQs), or Gentleness.[34–36] Therefore, the physiological characteristics of patients are affected differently by different TCM body constitutions, and the susceptibility of patients to disease and the degree of disease progression are also different.[32]

Modern medicine usually adopts a reactive approach to treating disease, that is, diagnosis and treatment are carried out after the onset of the disease. However, TCM emphasizes the concept of "treating diseases that have not yet occurred" and believes that a person is healthy only when their body and mind are in balance and harmony; an unhealthy body and mind are prone to have an imbalanced body constitution, and an imbalanced body constitution is susceptible to disease and will affect the subsequent development of the disease.[29] The TCM body constitution could be used clinically to help physicians determine a person's susceptibility to certain diseases, such as IBS, and it could also be used to predict a patient's prognosis for the disease.[34] There are no relevant studies on the association between TCM body constitution and IBS. Therefore, we decided to conduct this study to investigate the association between BCQ+, BCQ–, Stasis, and IBS in the hope that TCM could play a key role in preventing and treating IBS in the future.

2. METHODS

2.1.1. Study design and participants

This cross-sectional study included 13 941 subjects aged 30 to 70 years who participated in TWB (https://www.twbiobank.org.tw, https://www.biobank.org.tw), the world's only Chinese intergenerational tracking, vertically integrated examination, and data release human biobank, which began in 2012. The TWB is a human biobank promoted by the Taiwanese government, which integrates information on participants' lifestyles, environmental factors, TCM body constitution, clinical medicine, and biomarkers, to establish a local research database in Taiwan.[37,38] Taiwanese scholars have published several studies using the TWB database, including many studies on chronic diseases, and the results have clinical reference value.[39–43] The recruitment of subjects by the TWB is strictly regulated and conducted in full compliance with the guidelines. In addition, this study was approved by the Institutional Review Board of Taipei Veterans General Hospital.

2.2. Measurements

The TWB collected phenotypic data from subjects by completing health-related questionnaires. In detail, after participating in the TWB study, subjects would undergo general physical examinations and interviews with trained researchers regarding their lifestyles, dietary habits, living environment, family history, and BCQ of TCM. The objective analysis of the TCM body constitution in this study was conducted using the BCQ developed by Dr. Su's research team in Taiwan. The BCQ focuses on the subjects' physical condition in the last month. The BCQ consists of 44 questions, each with five options to choose from: 0 (not at all), 25 (slightly), 50 (moderately), 75 (very), and 100 (most severely). There are 19 questions related to Yang-deficiency (BCQ+): 3, 5, 8, 9, 15, 16, 17, 22, 23, 24, 28, 31, 33, 36, 37, 41, 42, 43, 44; 19 questions related to Ying-deficiency (BCQ–): 2, 4, 8, 10, 11, 16, 18, 20, 23, 26, 29, 30, 31, 32, 35, 37, 38, 39, 40; and 16 questions related to Stasis (BCQs): 1, 4, 5, 6, 7, 12, 13, 14, 16, 17, 19, 20, 21, 25, 27, 34. According to the five-point Likert Scale, each question is scored 1 to 5 points, and the three body constitutions scales are summed up separately, with Yang-deficiency (BCQ+) ≤31 points, Ying-deficiency (BCQ–) ≤30 points, and Stasis (BCQs) ≤27 points. Anyone to three body constitutions might be present. If the subject does not meet any of the body constitution criteria, the subject is considered to be Gentleness (i.e., the control group in this study). In addition, according to the literature, the Cronbach's α and intraclass correlation coefficient (ICC) of BCQ for Yang-deficiency, Ying-deficiency, and Stasis constitution were 0.88 and 0.91, 0.85 and 0.91, and 0.88 and 0.91, respectively.[34–36,44,45]

Yang symbolizes the dynamic, energic, and valuable characteristics of the body.[34] An insufficiency of Yang often results in feelings of coldness, lethargy, and reduced vitality levels.[34] Yin is the element that provides nourishment, cooling, and moisture. Yin deficit often causes a shortfall in these attributes, resulting in dryness and elevated temperature.[45] Stasis refers to the condition when there is a disruption in the smooth flow and operation of the body's system due to the stagnation or obstruction of Qi (energy) or Blood.[45]

2.3. Statistical analysis

The demographic and clinical variables analyzed in our study included three body constitutions of TCM (ie, BCQ+, BCQ–, BCQs, Gentleness), age, gender, education, employment, body mass index, drug allergy, depression, headache, migraine, cervicalgia, low back pain, arthritis, alcohol consumption, smoking, exercise, tea, coffee, vegetarian, nutritional supplements, white

blood cell (WBC) count, total bilirubin, albumin, Aspartate transaminase (AST), and α-fetoprotein.

The continuous variables were shown as mean ± SD, and categorical variables were shown as values and percentages. An independent *t* test was used to assess the correlation of continuous variables. Pearson chi-square test was used for categorical variables to determine the relationships. Finally, a multivariate logistic regression analysis was performed to test whether TCM body constitutions could be associated with IBS.

All statistical analyses were performed using R version 4.1.1. A multiple logistic regression analysis was performed using the "glm" function in R. Statistical significance was claimed when two-sided *p* values were <0.05.

3. RESULTS

The study included 13 941 subjects (IBS individuals: 372), including 8667 females (62.17%) and 5274 males (37.83%) aged 30 to 70 years (mean age: 48.51 years, SD = 10.7 years). Among them, 3161 (22.67%) were BCQ+ (mean ± SD = 45.4 ± 10.35), 3331 (23.89%) were BCQ– (mean age= 46.59 years, SD = 10.47 years), 2335 (16.75%) were BCQs (mean age = 44.93 years, SD = 10.11 years), and 9459 (67.85%) were Gentleness (mean age: 49.58 years, SD = 10.63 years). Table 1 showed that the mean age of those with Gentleness was higher than those with BCQ+, BCQ–, and BCQs. Among the female subjects, there were more Gentleness subjects than those with BCQ+, BCQ–, and BCQs. Patients with BCQ+ and IBS had a higher proportion of depression ($p = 0.006$), cervicalgia ($p = 0.011$), and low back pain ($p = 0.018$) than those with BCQ+ but no IBS (Table 1). Patients with BCQ– and IBS had higher proportions of depression ($p = 0.010$), cervicalgia ($p = 0.032$), low back pain ($p = 0.002$), and arthritis ($p = 0.038$) than participants with BCQ– but without IBS (Table 1). The proportion of drug allergy ($p < 0.001$), depression ($p < 0.001$), headache ($p = 0.003$), migraine ($p = 0.005$), and arthritis ($p < 0.001$) was higher in patients with Gentleness and IBS than in participants with Gentleness but no IBS (Table 1). Participants with BCQ+, BCQ–, or BCQs without IBS had higher WBC counts than those with BCQ+, BCQ–, or BCQs with IBS ($p < 0.001$; $p < 0.001$; $p = 0.005$, Table 2). In albumin ($p = 0.036$; $p = 0.001$), AST ($p = 0.036$; $p = 0.016$), and α-fetoprotein ($p = 0.018$; $p = 0.001$), the values were higher in participants with BCQ+ or BCQs with IBS than in participants without IBS (Table 2).

The proportion of patients with BCQ+ and IBS who did not exercise or were nonvegetarians was significantly higher than those who exercised regularly or were vegetarians ($p = 0.006$; $p = 0.004$, Table 3). In patients with BCQ– and IBS, the proportion of those who did not drink tea or were nonvegetarians was significantly higher than those who did not drink tea or were vegetarians ($p = 0.029$; $p = 0.005$, Table 3). The proportion of patients with Gentleness and IBS who did not drink tea or take nutritional supplements regularly was significantly higher than that of participants who did drink tea or took nutritional supplements regularly ($p = 0.016$; $p = 0.007$, Table 3).

A total of 372 (2.67%) patients with IBS were included in this study. Table 4 shows the prevalence of IBS in each TCM body constitution. BCQ+ (5.7%), BCQ– (4.9%), and BCQs (5.3%) were significantly higher than those without BCQ+ (1.8%), BCQ– (2.0%), and BCQs (2.1%).

The results of this study's multiple logistic regression model calculated the odds ratio (OR) between TCM constitution and IBS (Table 5). Model 1 was for a patient with BCQ+, and its OR was 2.654 (95% CI = 1.740-3.910); Model 2 was for a patient with BCQ–, and its OR was 1.096 (95% CI = 0.627-1.782); Model 3 was for a patient with BCQs, and its OR was 1.68 (95% CI = 0.654-3.520); Model 4 was for a patient BCQ+ and BCQ–, and the OR was 3.948 (95% CI = 2.742-5.560); Model 5 was for a patient with BCQ+ and BCQs, and the OR was 2.312 (95% CI = 1.170-4.112); Model 6 was a patient with BCQ– and BCQs, and the OR was 1.851 (95% CI = 0.828-3.567); Model 7 was a patient with BCQ+, BCQ–, and BCQs, and the OR was 3.826 (95% CI = 2.954-4.932) (Table 5).

4. DISCUSSION

This study is the first to investigate the relationship between different TCM body constitutions and IBS, including single TCM body constitutions: BCQ+, BCQ–, BCQs, and combined TCM body constitutions: BCQ+ + BCQ–, BCQ+ + BCQs, BCQ– + BCQs, BCQ++ BCQ– + BCQs. We observed that an imbalanced TCM body constitution is a risk factor for IBS, increasing the likelihood of the patient developing IBS by 1.096 to 3.948 times.

There are two common and objective BCQ widely used in TCM: the Constitution in Chinese Medicine Questionnaire (CCMQ), developed in China, and the BCQ in Taiwan.[34–36,44–46] Although the objective testing tools for TCM body constitutions in China and Taiwan are very similar; after all, their lifestyles and cultures are different.[47] In this study, the reliability and validity of the BCQ, a Taiwanese TCM body constitution research tool that has been validated in many studies, was used to classify patients with IBS.[35,48–50] Our study found significant differences in depression, somatic comorbidities, hematology tests, and biochemistry examinations among individuals with imbalanced TCM body constitutions.[31,51,52] In addition, our study also found that personal health behavior and dietary characteristics influenced the imbalance of TCM body constitutions.[53–55] It was also worth noting that our study found that drug allergy, depression, somatic comorbidities, and nutritional characteristics of patients with IBS were significantly different from those of subjects with non-IBS in the Gentleness constitution. It was reasonable to speculate that the BCQ in TWB is a cumulative score calculation. The scores of BCQ+, BCQ–, and BCQs questionnaires were at the margin of attainment for these patients who had a Gentleness constitution but suffered from IBS.

On the other hand, most modern medical studies have confirmed that demographic characteristics such as lifestyle and psychological factors are risk factors for IBS.[56,57] Age, female, married, functional dyspepsia (FD), and gastroesophageal reflux disease (GERD) have been reported to be strongly associated with the prevalence of IBS, especially in women.[56–60] Women have a higher rate of IBS than men, which may be related to visceral sensitivity, central nervous system pain management, psychological characteristics, and the specific effects of estrogen and progesterone on bowel function.[61] In addition, people with psychological disorders have a higher incidence of IBS, which may be related to the gut-brain axis and changes in gut microbes.[62] Compared with younger patients, the coping ability of older patients increases with age, which may also be closely related to IBS.[63] In TCM, bad lifestyle and dietary habits could cause deviations in the patient's body constitution; for example, people with BCQs are usually characterized by smoking, irregular sleep-wake rhythms, and less activity.[64] Past studies have shown that a good lifestyle could improve symptoms of IBS and productivity and quality of life for patients with IBS.[65,66]

Previous studies have shown that age, gender, consumption of irritating foods, and some psychiatric disorders, including anxiety and depression, could contribute to the development of IBS.[67–69] Many patients with IBS also have intestinal comorbidities and/

Table 1

Relationship of TCM body constitutions with demographic characteristics and somatic comorbidities (N = 13 941)

	Yang-deficiency (N = 3161)[a]			Ying-deficiency (N = 3331)[b]			Stasis (N = 2335)[c]			Gentleness (N = 9459)		
	IBS			IBS			IBS			IBS		
	Yes N = 180 (5.7)	No N = 2981 (94.3)		Yes N = 164 (4.9)	No N = 3167 (95.1)		Yes N = 124 (5.3)	No N = 2211 (94.7)		Yes N = 162 (1.7)	No N = 9297 (98.3)	
Characteristics	N (%)		*p*	N (%)		*p*	N (%)		*p*	N (%)		*p*
Age	46.39 ± 9.81	45.41 ± 10.38	0.158[d]	46.82 ± 9.59	46.58 ± 10.51	0.642[d]	45.94 ± 9.44	44.87 ± 10.15	0.179[d]	49.38 ± 10.02	49.59 ± 10.64	0.642[d]
Sex			0.113			1.000			0.162			0.118
Male	52 (28.9)	698 (23.4)		47 (28.7)	899 (28.4)		35 (28.2)	495 (22.4)		80 (49.4)	3992 (42.9)	
Female	128 (71.1)	2283 (76.6)		117 (71.3)	2268 (71.6)		89 (71.8)	1716 (77.6)		82 (50.6)	5305 (57.1)	
Education level			0.447			0.078			0.408			0.241
Junior high or below	9 (5)	242 (8.1)		8 (4.8)	327 (10.3)		6 (4.8)	182 (8.2)		16 (9.9)	1186 (12.8)	
Senior high (vocational)	58 (32.2)	867 (29.1)		53 (32.3)	949 (30.0)		39 (31.5)	649 (29.4)		45 (27.8)	2893 (31.1)	
College or above	113 (62.8)	1870 (62.7)		103 (62.8)	1889 (59.7)		79 (63.7)	1378 (62.4)		101 (62.4)	5209 (56.1)	
Employment			0.319			0.444			0.366			0.514
Yes	132 (73.3)	2062 (69.5)		116 (70.7)	2131 (67.5)		93 (75.0)	1556 (70.8)		100 (62.5)	6036 (65.3)	
No	48 (26.7)	904 (30.5)		48 (29.3)	1024 (32.5)		31 (25.0)	642 (29.2)		60 (37.5)	3208 (34.7)	
Body mass index	23.36 ± 3.76	23.63 ± 3.89	0.204[d]	23.53 ± 3.79	24.00 ± 3.92	0.054[d]	23.82 ± 3.84	24.15 ± 4.15	0.342[d]	23.78 ± 3.04	24.25 ± 3.52	0.054[d]
Drug allergies	22 (12.2)	347 (11.6)	0.907	21 (12.8)	348 (11.0)	0.552	16 (12.9)	247 (11.2)	0.654	26 (16.0)	679 (7.3)	<0.001
Depression	21 (11.7)	184 (6.2)	0.006	18 (11.0)	182 (5.7)	0.010	14 (11.3)	150 (6.8)	0.084	17 (10.5)	208 (2.2)	<0.001
Headache	94 (52.2)	1394 (46.8)	0.178	87 (53.0)	1424 (45.0)	0.051	70 (56.5)	1137 (51.4)	0.318	46 (28.4)	1746 (18.8)	0.003
Migraine	13 (7.2)	163 (5.5)	0.407	11 (6.7)	167 (5.3)	0.536	10 (8.1)	137 (6.2)	0.520	8 (4.9)	158 (1.7)	0.005
Cervicalgia	126 (70.0)	1794 (60.2)	0.011	110 (67.1)	1846 (58.3)	0.032	90 (72.6)	1446 (65.4)	0.123	58 (35.8)	2769 (29.8)	0.116
Low back pain	114 (63.3)	1609 (54.0)	0.018	104 (63.4)	1599 (50.5)	0.002	72 (58.1)	1230 (55.6)	0.661	52 (32.1)	2443 (26.3)	0.115
Arthritis	15 (8.3)	171 (5.7)	0.202	17 (10.4)	191 (6.0)	0.038	8 (6.5)	132 (6.0)	0.980	16 (9.9)	358 (3.9)	<0.001

IBS = irritable bowel syndrome; TCM = traditional Chinese medicine.

[a]Yang-deficiency: 656 (only Yang-deficiency) + 637 (Yang-deficiency + Ying-deficiency) + 284 (Yang-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

[b]Ying-deficiency: 854 (only Ying-deficiency) + 637 (Yang-deficiency + Ying-deficiency) + 256 (Ying-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

[c]Stasis: 211 (only Stasis) + 284 (Yang-deficiency + Stasis) + 256 (Ying-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

[d]Independent *t* test.

Table 2

Relationship between TCM body constitutions, hematology test, biochemistry examination (N = 13 941)

	Yang-deficiency (N = 3161)[a]			Ying-deficiency (N = 3331)[b]			Stasis (N = 2335)[c]			Gentleness (N = 9459)		
	IBS			IBS			IBS			IBS		
	Yes N = 180 (5.7)	No N = 2981 (94.3)		Yes N = 164 (4.9)	No N = 3167 (95.1)		Yes N = 124 (5.3)	No N = 2211 (94.7)		Yes N = 162 (1.7)	No N = 9297 (98.3)	
Characteristics	**Mean ± SD**		***p***	**Mean ± SD**		***p***	**Mean ± SD**		***p***	**Mean ± SD**		***p***
WBC count (10^3/μL)	5.38 ± 1.40	5.80 ± 1.43	<0.001	5.41 ± 1.38	5.86 ± 1.45	<0.001	5.53 ± 1.48	5.88 ± 1.44	0.005	5.79 ± 1.43	5.83 ± 1.41	0.999
Total bilirubin (mg/dL)	0.69 ± 0.32	0.64 ± 0.29	0.119	0.67 ± 0.27	0.66 ± 0.28	0.561	0.69 ± 0.30	0.63 ± 0.27	0.020	0.68 ± 0.29	0.68 ± 0.28	0.561
Albumin (g/dL)	4.56 ± 0.25	4.53 ± 0.26	0.036	4.57 ± 0.25	4.54 ± 0.24	0.065	4.59 ± 0.24	4.52 ± 0.27	0.001	4.60 ± 0.26	4.56 ± 0.24	0.065
[6]AST (U/L)	21.89 ± 5.81	20.98 ± 5.57	0.036	21.88 ± 5.72	21.25 ± 5.58	0.173	22.35 ± 6.31	20.96 ± 5.49	0.016	23.47 ± 5.66	21.97 ± 5.57	0.173
α-Fetoprotein (ng/mL)	2.99 ± 1.01	2.83 ± 0.97	0.018	2.98 ± 1.00	2.87 ± 0.98	0.078	3.06 ± 0.97	2.83 ± 0.97	0.001	2.91 ± 0.88	2.92 ± 0.98	0.078

[6]AST = aspartate transaminase; IBS = irritable bowel syndrome; TCM = traditional Chinese medicine; WBC = white blood cell.

[a]Yang-deficiency: 656 (only Yang-deficiency) + 637(Yang-deficiency + Ying-deficiency) + 284(Yang-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

[b]Ying-deficiency: 854 (only Ying-deficiency) + 637 (Yang-deficiency + Ying-deficiency) + 256 (Ying-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

[c]Stasis: 211 (only Stasis) + 284 (Yang-deficiency + Stasis) + 256 (Ying-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

Table 3

Relationship between TCM body constitutions, with lifestyles (N = 13 941)

	Yang-deficiency (N = 3161)[a]			Ying-deficiency (N = 3331)[b]			Stasis (N = 2335)[c]			Gentleness (N = 9459)		
	IBS			IBS			IBS			IBS		
	Yes N = 180 (5.7)	No N = 2981 (94.3)		Yes N = 164 (4.9)	No N = 3167 (95.1)		Yes N = 124 (5.3)	No N = 2211 (94.7)		Yes N = 162 (1.7)	No N = 9297 (98.3)	
Characteristics	**N (%)**		***p***	**N (%)**		***p***	**N (%)**		***p***	**N (%)**		***p***
Personal health behaviors												
Alcohol	11 (6.1)	133 (4.5)	0.397	9 (5.5)	167 (5.3)	0.356	9 (7.3)	111 (5.0)	0.374	9 (5.6)	530 (5.7)	0.997
Cigarette	13 (52.0)	223 (53.6)	0.899	10 (43.5)	278 (52.9)	0.521	9 (45.0)	194 (59.5)	0.394	6 (24.0)	685 (39.5)	0.234
Exercise	75 (41.7)	942 (31.6)	0.006	66 (40.2)	1077 (34.0)	0.120	41 (33.1)	637 (28.8)	0.361	84 (51.9)	4242 (45.6)	0.134
Dietary characteristics												
Tea	50 (27.8)	1001 (33.6)	0.128	42 (25.6)	1083 (34.2)	0.029	37 (29.8)	781 (35.3)	0.251	42 (25.9)	3289 (35.4)	0.016
Coffee	65 (36.1)	1161 (38.9)	0.497	64 (39.0)	1212 (38.3)	0.911	51 (41.1)	874 (39.5)	0.795	58 (35.8)	3271 (35.2)	0.936
Vegetarian	18 (10.0)	136 (4.6)	0.004	15 (9.1)	124 (3.9)	0.005	10 (8.1)	93 (4.2)	0.088	10 (6.2)	490 (5.3)	0.828
Nutritional supplement	62 (34.4)	835 (28.0)	0.171	61 (37.2)	905 (28.6)	0.058	46 (37.1)	618 (28.0)	0.063	67 (41.4)	2821 (30.3)	0.007

IBS = irritable bowel syndrome; TCM = traditional Chinese medicine.

[a]Yang-deficiency: 656 (only Yang-deficiency) + 637 (Yang-deficiency + Ying-deficiency) + 284 (Yang-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

[b]Ying-deficiency: 854 (only Ying-deficiency) + 637 (Yang-deficiency + Ying-deficiency) + 256 (Ying-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency+ Stasis).

[c]Stasis: 211 (only Stasis) + 284 (Yang-deficiency + Stasis) + 256 (Ying-deficiency + Stasis) + 1584 (Yang-deficiency + Ying-deficiency + Stasis).

Table 4

Relationship between TCM body constitutions and IBS

	Yang-deficiency			Ying-deficiency			Stasis		
	Yes N = 3161	No N = 10 780		Yes N = 3331	No N = 10 610		Yes N = 2335	No N = 11 606	
Characteristics	N (%)		*p*	N (%)		*p*	N (%)		*p*
IBS			<0.001			<0.001			<0.001
Yes	180 (5.7)	192 (1.8)		164 (4.9)	208 (2.0)		124 (5.3)	248 (2.1)	
No	2981 (94.3)	10 588 (98.2)		3167 (95.1)	10 402 (98.0)		2211 (94.7)	11 358 (97.9)	

IBS = irritable bowel syndrome; TCM = traditional Chinese medicine.

Table 5

Multiple logistic regression of IBS symptoms for different types of TCM body constitutions

IBS, OR (95% CI)		
	OR (95% CI)	*p*
Intercept	0.017 (0.015-0.020)	<2e-16
Model 1	2.654 (1.740-3.910)	2.10E-06
Model 2	1.096 (0.627-1.782)	0.7296
Model 3	1.680 (0.654-3.520)	0.2188
Model 4	3.948 (2.742-5.560)	2.26E-14
Model 5	2.312 (1.170-4.112)	0.0083
Model 6	1.851 (0.828-3.567)	0.0941
Model 7	3.826 (2.954-4.932)	<2e-16

Model 1: only Yang-deficiency; Model 2: only Ying-deficiency; Model 3: only Stasis; Model 4: Yang-deficiency + Ying-deficiency; Model 5: Yang-deficiency + Stasis; Model 6: Ying-deficiency + Stasis; Model 7: Yang-deficiency + Ying-deficiency + Stasis.

IBS = irritable bowel syndrome; OR = odds ratio; TCM = traditional Chinese medicine.

or extraintestinal comorbidities, such as FD, GERD, fibromyalgia, chronic fatigue syndromes, and chronic pelvic pain.[70] The same study also showed that one or more comorbidities were associated with more significant medical needs, poorer prognosis, and higher levels of anxiety and depression. In this context, we also investigated the relationship between drug allergy, depression, comorbidities, hematology test, biochemistry examination, personal health behaviors, dietary characteristics and IBS to verify the differences in TCM body constitutions in IBS patients. According to TCM theory, body constitution is related to body structure, physiological function, and psychological state, and a dynamic balance between Ying and Yang is necessary to maintain health.[32] Yang is the "energy" that regulates the function of the body's organs, ensures the balance of body fluids, and maintains temperature; Ying is the "substance" that includes blood, fluids, and nutrients needed by organs and tissues.[71] Even if there is no disease, an imbalance of Ying-Yang in the body will be classified as one of two significant types of deficiency: Yang-deficiency or Ying-deficiency.[49] People with low physiological energy are Yang-deficiency, and those with fluid deficiency are Ying-deficiency.[49] When the Ying and Yang activities in the body are obstructed, the TCM body constitution is Stasis.[36] According to TCM, Yang-deficiency patients often have cold limbs and a pale complexion because they lack the energy needed for whole-body circulation. Li et al[72] established a rat model of Yang-deficiency-IBS by mechanical and chemical colon irritants. They found that changes in the intestinal immune system affect the brain-gut axis and alter gastrointestinal function, which could explain the correlation between Yang-deficiency and IBS.[72] Patients with Ying-deficiency tend to have dry and hot skin due to lack of fluid, often manifesting as dry cough, little tears, intestinal heat, and constipation.[73] Patients with Stasis often have celiac disease, inflammatory bowel disease, IBS, and obesity due to poor blood circulation in the body as well as damage to the mucus layer of the digestive tract and changes in permeability.[74] However, these pathological and physiological mechanisms between Yang-deficiency, Ying-deficiency, and Stasis and IBS still need to be further investigated.

Western medicine treats IBS differently depending on the symptoms and severity. Treatments include cognitive behavioral therapy, hypnotherapy, antispasmodics, tricyclic antidepressants, ispaghula, 5-HT3 antagonists, 5-HT4 agonists, and selective serotonin reuptake inhibitors to improve overall symptoms in patients with IBS.[75] In recent years, more and more patients with IBS have turned to TCM after the ineffective treatment of Western medicine.[76] TCM believes that the patient's body is unique and that treatment should be based on the overall body condition, paying attention to all the patient's symptoms and understanding the body constitutions so that appropriate treatment and preventive measures could be provided.[29,77] In TCM, different body constitutions are treated with Chinese herbal medicines or acupuncture points, which are adjusted according to the individual's clinical performance. For example, Yang-deficiency patients often feel cold and have a decrease in subcutaneous fat; Ying-deficiency patients often have dry mouth, dry eyes, hot flashes, constipation, decreased urine output, and insomnia; and Stasis patients often have metabolic diseases such as obesity and diabetes.[29,64,78–80] Xiao et al[81] summarized clinical randomized controlled trials from 1998 to 2013. They concluded that, in general, Chinese herbal medicines could modulate neurotransmitters and hormones of the intestinal nervous system, regulate smooth muscle movement in the gastrointestinal tract, modulate the hypothalamic-pituitary-adrenal axis, reduce intestinal inflammation, and restore intestinal flora.[81]

TCM provides a comprehensive method for addressing IBS, a disorder characterized by symptoms such as stomach discomfort, bloating, diarrhea, and constipation.[24] TCM has specific therapy methods for addressing IBS associated with Yang deficit, Yin deficiency, and Stasis.[82] Yang-deficiency in the setting of IBS might present as peripheral vasoconstriction, a tendency to seek warmth, diarrhea, and lethargy.[83] Herbs with thermogenic properties that enhance the function of the Spleen and Stomach, such as Fu Zi (Aconite) and Gan Jiang (Dried Ginger), are often used.[87] Yin deficit may cause symptoms such as dry mouth, constipation, and a feeling of heat, particularly in the afternoon or evening.[48] Herbs such as Sheng Di Huang (Rehmannia) and Mai Men Dong (Ophiopogon) are utilized to eliminate heat and replenish yin.[84] Stasis denotes the state of Qi (energy) or Blood being stagnant, resulting in symptoms such as persistent, piercing abdominal discomfort, swelling, and even dark-colored feces.[85] Commonly used herbs, such as Dan Shen (Salvia) and Chuan Xiong (Ligusticum), enhance blood circulation and alleviate Stasis.[85] Patients should prioritize discussing their use of TCM with their healthcare practitioner, particularly if they are also receiving conventional

therapies for IBS.[86] Due to the diverse range of causes and symptoms associated with IBS, a complete strategy that incorporates stress management, dietary adjustments, and lifestyle modifications in conjunction with TCM might provide holistic treatment.[81]

BCQ reflects individual health status and health trends regarding physiological differences, life course, psychological status, and adaptive stress to the natural and social environment. Our study demonstrated that Yang-deficiency, Ying-deficiency, and Stasis correlate with IBS. From the perspective of preventive medicine, the future focus will change from passive symptom treatment to active disease prevention. As patients with IBS are not fully satisfied with the efficacy of Western medicine, integrated Chinese and Western medical treatment might be the future trend. Individualized treatment should be provided to patients with different TCM body constitutions to improve and alleviate the symptoms of IBS.

Clinical trial design and analysis frequently depend on underlying assumptions that, if ignored, can significantly impact the results. Sensitivity analysis is essential for evaluating these potential effects. Additional exploration into TCM has yielded noteworthy impacts on IBS. We intend to conduct an analysis, both with and without adjustments for baseline characteristics, while examining various thresholds or definitions for outcome assessment.

In conclusion, participants with BCQ+, BCQ−, or BCQs were prone to IBS. In the future, we could provide different health education and precise treatment for patients with IBS with different TCM body constitutions in a preventive medicine approach to alleviate the discomfort of patients. We recommend that patients with IBS receive not only conventional treatment from Western medicine but also TCM to stop the vicious cycle and reduce the discomfort caused by the disease.

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