

ORIGINAL RESEARCH

Constitutions in Traditional Chinese Medicine and Factors Influencing Them in Jilin Province of China

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ABSTRACT

Context • The identification of a patient's constitution in Traditional Chinese Medicine (TCM) allows physicians to understand his or her risk for different diseases, forecast the mechanism of disease development, and direct treatment strategies, such as herbs and/or acupuncture. However, very few large-scale clinical trials have occurred on the relationships of the TCM constitution to lifestyles and diseases.

Objective • The study intended investigate the complex and systematic relationship between the TCM constitution and lifestyles to provide solutions for adjusting unbalanced constitutions and maintaining a balanced constitution and health state among people of various lifestyles in Jilin, China.

Design • The research team conducted a randomized cross-sectional survey.

Setting • The study took place in Jilin Province in China.

Participants • Participants were 1755 residents of Jilin Province in China, 794 men and 961 women, between September 2006 and February 2013.

Outcome Measures • The research team: (1) collected participants' data using a basic informational and lifestyle questionnaire and the Constitution in Chinese Medicine Questionnaire (CCMQ); (2) used descriptive analysis to illustrate demographic characteristics and the distribution of TCM constitutions; (3) conducted multivariate logistic regressions to explore potential factors influencing the Deficiency, Excess, Gentleness, and Special-diathesis constitutions.

Results • Approximately one-half of participants in Jilin, China had an unbalanced constitution and one-third had Deficiency constitutions. Lifestyles and disease histories were significant

influencing factors for the unbalanced constitutions. Of the 1755 participants, 757 had the Gentleness constitution (43.1%); the remaining participants had unbalanced constitutions, including 501 with a Deficiency constitution (28.6%), 423 with an Excess constitution (24.1%), and 74 with a Special-Diathesis constitution (4.2%). Regarding the influencing factors, the Deficiency constitutions were significantly related to lifestyle factors—especially gender, age, exercise, and diet: (1) the Qi-deficiency constitution was significantly related to excessive exercise and chronic bronchia; (2) the Yang-deficiency constitution was significantly related to female gender and prefer to hot food; and (3) the Yin-deficiency constitution was significantly related to age, from 46 to ≥ 66 , and the barbecue diet. The Excess constitutions were related to medical histories: (1) the Phlegm-dampness and Blood-stasis constitutions were both significantly related to cardio-cerebrovascular disease and hyperlipidemia; (2) the Dampness-heat constitution was significantly related to liver disease and osteoporosis; (3) the Qi-depression constitution was significantly related to liver disease and chronic bronchia. The Gentleness constitution was significantly related to a greasy diet, and the Special-diathesis constitution was significantly related to allergies.

Conclusions • The identification of TCM constitutions would be beneficial to early identification of potential risk factors and could contribute to the creation of more comprehensive guidelines for health organizations. Controlling the factors influencing the TCM constitutions and using health management plans based on the TCM constitution could help people with unbalanced constitutions to adjust their lifestyles and improve their health. (*Altern Ther Health Med.* 2023;29(8):188-199).

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The human constitution in Traditional Chinese Medicine (TCM) describes the physical and biochemical essence of the human body. It dates back to a classical book, the *Yellow Emperor's Canon of Medicine*, published more than 2000 years ago.¹ Traditionally, physicians evaluate TCM constitutions using four diagnostic methods which are look, listen, question and feel the pulse—four ways of diagnosis (look, listen, question and feel the pulse) to create customized health care.

Knowing the various human constitutions allows physicians to understand a patient's risk for different diseases, forecast the mechanism of disease development, and direct

treatment strategies, such as herbs and/or acupuncture. Therefore, the human constitution has been a very significant part of the TCM theory.

In the practice of TCM, human-constitution judgment is very professional, and clinicians see many subtypes. Constitution identification was assessed during the previous clinical practice solely on a patient's symptoms by regarding the constitution of a human being as a perceptual object. In previous clinical practices, the approach of assessing constitution based solely on a patient's symptoms was considered to be overly simplistic and reliant on experiential judgement, nor is it appropriate for a large-scale epidemiological inquiry to incorporate hypotheses about TCM constitutions.

To solve this problem, in 2009 the China Association of Chinese Medicine (No. ZZYXH/T157-2009) optimized the TCM constitution classification system and published a TCM constitution questionnaire based on epidemiological studies of more than 20 000 individuals, with experts' agreement, to differentiate TCM constitutions.²

A TCM constitution is inherited and acquired, and in TCM theory, three primary factors affect human constitutions: (1) heredity—genetic makeup and inherent character, such as family diseases; (2) ontogeny—acquired endowments at a stage of growth, such as through lifestyle and eating habits; and (3) the environment—climate, and factors related to the geographical environment.

Balanced and Unbalanced Constitutions

Of the TCM constitution types, gentleness is a balanced constitution representing an overall, ideal healthy state for an individual, and the other types are unbalanced constitutions.

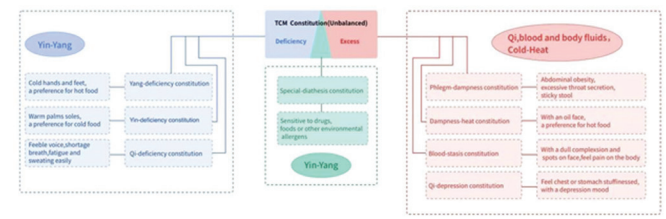
Furthermore, the ideal balanced state of Yin-Yang represents the Gentleness constitution. People with that constitutions are in good physical and mental states in a proper lifestyle with healthy states. Wang Qi pointed that Gentleness constitution reflects a balanced Yin-Yang Qi-blood and Fluid-humor health statuses.³ Moreover, eight biased TCM constitutions were closely related to specific diseases.⁴

Generally, individuals with unbalanced constitutions are more prone to disease than those with the balanced constitution. Unbalanced constitutions include three groups (Figure 1): (1) Deficiency constitutions, (2) Excess constitutions, and (3) Special-diathesis constitutions. Deficiency and Excess are a pair of core concepts in the TCM theoretical system and appear as key terms in TCM classical treaties.

Deficiency constitutions. The deficiencies create an unbalanced, unhealthy state of Yin-Yang and create a lack of energy for functioning—an imbalance and deficiency of Yin-Yang. If individuals have Deficiency constitutions, deficiency factors can easily attack their bodies. Deficiency constitutions may be further categorized into three subtypes: (1) Qi-deficiency, (2) Yang-deficiency, and (3) Yin-deficiency.

Excess constitutions. An Excess constitution points to a fullness and excess of Qi, blood, or body fluids, which can accumulate to be pathogenic factors inside the body and can

Figure 1. Unbalanced TCM Constitutions



obstruct circulation, a state of excessive energy. If an individual has an Excess constitution, the body's Excess condition accumulates Excess-Evil. The pathological products through the main and collateral channels and exacerbate an unbalance of Yin-Yang, resulting in poor functioning of nourishing viscera and organisms, leading to severe diseases. Excess constitutions may be further classified into four subtypes: (1) Phlegm-dampness, (2) Dampness-heat, (3) Blood-stasis, and (4) Qi-depression.

Special-diathesis constitution. The Special-diathesis constitution is a disorder of Yin-Yang and consists of physiological defects and allergies.

Constitution Types

Deficiency constitutions may be further categorized into three subtypes: (1) Qi-deficiency, (2) Yang-deficiency, and (3) Yin-deficiency. Excess constitutions may be further classified into four subtypes: (1) Phlegm-dampness, (2) Dampness-heat, (3) Blood-stasis and (4) Qi-depression. The Special-diathesis constitution is related to allergies, it is the disorder and sensitive state of human body.

Qi-deficiency constitution. The Qi-deficiency constitution occurs as the state of energy weakens, as indicated by such features as a faint low voice, fatigue, paleness, shortness of breath, and low spirits. Moderate and regular physical activities are beneficial to stimulate the smooth movement of Qi. However, if people exercise excessively until the body's functioning begins to decline, the activity can consume Qi and energy beyond the proper range of physiological activities.⁵ The deficiency of Qi leads to hypofunction and imbalance, and thus, forms to Qi-deficiency constitution.

Yang-deficiency constitution. Some studies have found that the incidence of the Yang-deficiency constitution was higher in women than in men, mainly because men and women have different physiological characteristics, resulting in differences in their physiological functions, genes, and environments.⁶⁻⁹

With respect to physical characteristics, the TCM theory of Yin and Yang identifies males as belonging to Yang and having the characteristics of Yang, including a robust body with strong muscles, fast actions, an extroverted temperament, and generally strong viscera functions.¹⁰ Females belong to Yin and have the characteristics of Yin, including a slender body, delicate skin, an introverted temperament, and weak viscera functions. The physical differences between males and females are due to the differences in their physiological and Yin-yang natures.

Tang et al found that a Yang-deficiency constitution was related to polymorphisms of the regulator of G protein signaling 6 (RGS6), metabotropic glutamate receptor 5 (mGluR5), glyceraldehyde-3-phosphate dehydrogenase 19 (GAPDH19), and IKAROS family zinc finger 1 (IKZF1) genes, which in turn relate to changes in cyclic adenosine monophosphate (AMP) and the metabolic energy state and immune functions.¹¹

Studies have also associated environmental factors with the Yang-deficiency constitution. For example, Li YS, Shen ZH, Li YN, et al found that the significant risk factors for Yang-deficiency include lack of sun exposure and rarely being able to stay in a warm environments in winter.^{12,46} Cold weather suppresses the generation of Yang. Also, genetic studies have shown opposite glucolipid metabolisms in the Yang-deficiency and Yin-deficiency constitutions, which provides evidence about the reasons that people with a Yang-deficiency constitution can easily get cold evil and fear cold.³

Yin-deficiency constitution. According to TCM theory, people in middle-age can easily fall into the Yin-deficiency constitution. It's characterized by loss of body fluid leading to excess heat. The Yin-deficiency constitution lacks fluid, and the individual prefers a hot diet such as warm soup, heated dishes, it would consume much more Yin and accumulate inner heat. Consequently, the imbalance of Yin-Yang is more severe.¹⁴ Wong found that the body function with Yang gradually declines with age much more than Yin.¹⁵

Phlegm-dampness constitution. Based on TCM constitution theory, the Phlegm-dampness constitution is a state in which phlegm has blended with dampness and been obstructed over a long period of time, due to a dysfunction of body-fluid transportation. Phlegm dampness is embodied in the accumulation of phlegm with the stagnation of the Qi mechanism.

Dampness evil has two aspects, based on its origin: external or internal. The dampness of the environment can cause external dampness evil. Internal dampness is the accumulation of body fluids and phlegm. In addition, an excessively high-calorie diet with an unhealthy lifestyle can cause abnormal transportation in the spleen and can generate internal dampness. Chien et al found that the phlegm-dampness constitution was significantly correlated with a high risk of metabolic syndrome.¹⁶

The Phlegm-dampness constitution affects the normal distribution of Qi with blood, which can lead to disease. Zhao et al and Sham et al found that TCM herbs can have good effects on hyperlipidemia for patients with a Phlegm-dampness constitution, by regulating Qi, removing dampness, and resolving phlegm and that these herbs include *C. pinnatifida* Bge and *Atractylodes macrocephala* Koidz Ginseng.^{17,18}

In general, an individual's susceptibility to dampness evil is closely related to Phlegm-dampness and Dampness-heat constitutions, because of the dysfunctional status of the Zang Fu organs. Internal and external dampness combined with cold or heat evil, can jointly affect the circulation of Qi,

blood, and body fluids, reflecting various Excess constitution characteristics.

Dampness-heat constitution. The Dampness-heat constitution is the condition of accumulating excess dampness and heat energy in the body, which primarily results from the dysfunction of the spleen. The obstruction of body fluids can generate interior dampness, because one of the functions of the spleen is to transport the fluids to the inner body.

TCM theory holds the view that the five viscera—liver, heart, spleen, lung, and kidney—are interconnected as a holistic system. If the spleen is too weak to create sufficient nutrients and essence, it could subsequently cause a lack of energy for the entire organism. The liver controls dispersion, regulates Qi activity, and promotes Qi. The dysfunction of liver Qi can produce pathological dampness, creating pathogenic fire derived from the stagnation of liver Qi and the dampness.¹⁹

To some extent, the spleen is an important physiological system for metabolizing nutrients, and scientists consider it to be the foundation for nurturing the kidney. Wang et al indicate that the kidney stores essence, which can be transformed into bone marrow to nourish the bones and strengthen the skeleton.²⁰

The Dampness-heat constitution represents a deficiency of the spleen and kidney, and the dysfunction of the spleen-kidney is an important factor in osteoporosis. Therefore, the constitution may be a potential factor in osteoporosis. Moreover, Luo et al and He et al found that TCM herbs and formulas can be useful in the treatment of osteoporosis by reinforcing the spleen and kidney.^{21,22}

Blood-stasis constitution. The blood-stasis constitution represents a tendency to stagnation of blood, which leads to a dysfunction in energy circulation in the meridian pathways throughout the body. Cold evil would make the blood stasis and suppress the heart Qi, which can lead to cardiovascular disease.

Chu et al found that the TCM formula Xue-Fu-Zhu-Yu-Tang can be an effective treatment for patients with hyperlipidemia who have the Blood-stasis constitution,²³ and it now has widespread use in clinics. As with the Phlegm-dampness constitution, improper diet and lack of exercise can affect the Blood-stasis constitution.

Moreover, current research also has revealed that TCM herbs benefit patients with hyperlipidemia primarily through antioxidation, inhibiting the absorption of exogenous lipids and cholic acid, preventing the synthesis of lipids, and reducing the deposition of lipids in the vascular endothelium.²⁴

Some herbs such as *Radix Salviae Miltiorrhizae* and *Rhizoma Chuanxiong* can reduce total cholesterol by promoting blood circulation and removing blood stasis for patients with the Blood-stasis constitution.²⁵⁻²⁶

Qi-depression constitution. From the perspective of TCM, the liver regulates the circulation of Qi in the whole body. examined the expression of the *Hnf4a*, *Hnf4y*, and *Cyp1a1* genes in a model with rats with liver Qi stagnation and spleen deficiency syndrome.²⁷

Several studies have used the Qi-depression rat model and found that herbs can prevent the potential diseases of the Qi-depression constitution.^{2,28} Moreover, the depression of Qi in the chest in the Qi-depression constitution can cause chronic bronchitis, which concerns the circulation of and can stagnate the lung Qi and do harm to respiratory capacity.

In addition, the poor dispersing of liver Qi in the Qi-depression constitution can cause dysfunctions of liver Qi and lung Qi. The stagnation and adverse flow of Qi could cause symptoms of chronic bronchitis, such as cough, headache, and discomfort from dyspnea.

Special-diathesis constitution. The Special-diathesis constitution represents a disorder and imbalance of Yin-Yang, which is often characterized by a predisposition of the body to allergen-induced conditions. Health is primarily determined by stability and the Yin-Yang equilibrium. However, factors such as innate and hereditary allergies can affect the Special-diathesis constitution.²⁹⁻³¹

TCM and Constitutions

TCM practitioners conduct personalized care and prevention in conjunction with the TCM constitution of each individual, thereby achieving maximum health results.^{10,32} For example, the symptom of Yang deficiency is synonymous with tiredness, somnolence, and fear of cold.⁷ In addition, Yang deficiency can be associated with arrhythmia, gastritis, dysmenorrhea, or enuresis. Based on the TCM hypothesis, therapy for Yang deficiency is supplementing and protecting Yang-Qi, and practitioners can treat it with herbs, such as Glycyrrhizae, cinnamomi, ginger, and ginseng.

The disruption of the internal and external environment of the human body is closely connected to the TCM constitution and diseases. For example, You et al found that the Phlegm-dampness and Dampness-heat constitutions are closely correlated with irregular serum cytokines and may theoretically act as indicators of diabetes.³³ Zhu et al found that certain chronic disorders such as cardio-cerebrovascular disease, obesity, and hyperlipidemia are associated with the Qi-deficiency, Phlegm-dampness, and Dampness-heat constitutions, respectively.⁶

The concept of lifestyle management emphasizes that individuals are responsible for their own health. People in different regions form various lifestyles, therefore developing individuals' constitutions. Simplicity, low cost, and convenience are the characteristics of TCM in maintaining health to prevent disease. Therefore, adjusting lifestyles is the simplest and most convenient way to stay healthy.

The medical model must change its focus from disease medicine to health medicine. The TCM constitution is relatively stable and dynamically variable. Therefore, an individual can change and develop his or her TCM constitution.

Individuals with Deficiency constitutions should be pay attention to regulating Qi, because Qi can generate and transfer energy. Also, they can supplement Yin or strengthen Yang according the particular TCM constitution.

The best lifestyle includes regular and proper exercise, sufficient sleep, and a balanced diet, which can improve Deficiency constitutions. Good practices include performing Wu Qin Xi—Five-Animal exercise and eating Ginseng chicken soup.

People with Excess constitutions should pay more attention to pathological products. Based to the different constitutions' predispositions toward Qi, blood, and body fluids, individuals can take measures to nourish blood, smooth vessels, and regulate Qi and fluids, in particular keeping warm in a cold environment, having a light diet, and avoiding smoking and drinking abuse. Individuals with Special-diathesis constitution should avoid contact with allergens and eat Wumei—smoked plum—daily.

Jilin Province

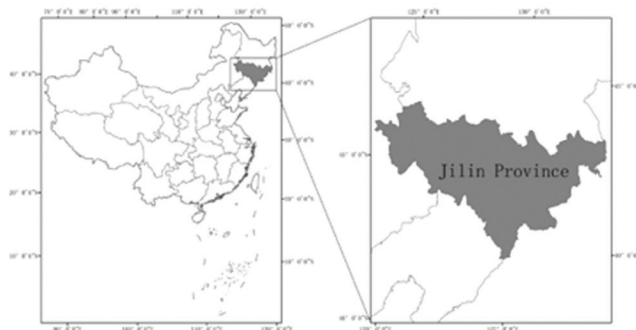
Previous investigations in China found that the dominant unbalanced TCM constitutions were Qi-deficiency, Yang-deficiency, and Qi-depression constitution in all of China, including the Southern and Northern regions.^{6,34,35} Some epidemiological studies have also shown that females have in higher incidence of Yang-deficiency constitution than males do in China.^{11,34,35} Other studies found that the Phlegm-dampness and Dampness-heat constitutions are more widespread in the southern part of China.⁷⁻⁹

Jilin Province is located in Northeast China (Figure 2), which is in a mid-temperate zone, with four distinct seasons, including a hot summer and cold winter. Jilin has cold weather in which Yang is lower and Yin is higher. Compared with southern China, the temperature in Jilin is lower; therefore, people receive less Yang and Qi from the environment, based on the TCM theory of pathogenic cold impairing Yang and Qi.^{7,9,36}

Some cross-sectional surveys have found that the climate factor (cold evil) and Excess constitutions are the two main reasons that Jilin residents are susceptible to hyperlipidemia and cardio-cerebrovascular disease.³⁷⁻³⁹ The main pathogenesis of cardio-cerebrovascular is external cold evil. Definitely, a long and cold winter exists in Northeast China, and cold evil could easily attack and invade the internal organs and meridians of the human body for a long time.

Some studies have found that winter in Jilin Province is an important period for the high incidence and recurrence of

Figure 2. Geographical Location of Jilin Province, China



cardio-cerebrovascular disease, due to the cold weather.^{12,40} The large difference in temperature between indoor and outdoor air can induce cardio-cerebrovascular disease.³³

The temperature difference could also generate air pollution. The majority of Jilin people cook in a closed environment in winter, and the fuel consumed in the process of cooking and the combustion products of the fuel could become the primary air pollutants in the indoor environment. Thus, air pollution is detrimental to the cardiovascular system. The main component of natural gas is methane (CH₄), and the main component of gas is carbon monoxide (CO). CO is an important risk factor for cardio-cerebrovascular diseases. The higher the concentration of CO in the air, the higher the incidence rate and mortality of cardiovascular and cardio-cerebrovascular diseases.⁴¹

Hung et al found that some TCM herbs or formulas can be effective in cardio-cerebrovascular disease for people with the Phlegm-dampness constitution, indicating that this intervention for the Phlegm-dampness constitution could decrease the morbidity of cardio-cerebrovascular disease.⁴¹

Understanding the associations between the lifestyles of the population in Northeast in China has gained more and more attention. Sang et al in China examined the factors influencing constitutions related to lifestyles and found constitutions were related to diet, sleeping, and physical activities.³⁵

Current Study

The investigation of human TCM constitutions allows consideration of the imbalance of the body and forecasting of the incidence, growth, and action of diseases. However, very few large-scale clinical trials have occurred on the relationships of the human TCM constitution to lifestyles and diseases. Most current studies have concentrated on discrepancies between balanced and unbalanced constitutions and lack systematic study or risk research for different diseases related to the TCM-constitution.

The current study intended to investigate the complex and systematic relationship between the TCM constitution and lifestyles to provide solutions for adjusting unbalanced constitutions and maintaining a balanced constitution and health state among people of various lifestyles in Jilin, China.

METHODS

Participants

The research team conducted a randomized, cross-sectional survey, which took place in Jilin Province in China. All interviewers had a bachelor's degree or higher in a TCM-related major, and interviewees are varies of degrees. Interviewers visited communities of Jilin Province in China and selected one interviewee out of five residents to conduct a questionnaire investigation between September 2006 and February 2013.

The study included potential participants if they were: (1) Chinese residents in Jilin Province and (2) over the age of 15.

The study excluded potential participants if they: (1) had organic lesions verified by a comprehensive and systematic

examination; (2) had a mental-health disorder; or (3) had a disease verified through comprehensive physical examination, including serious primary cardiovascular disease, liver disease, kidney disease, hematological disease, lung disease, or serious diseases affecting their survival, such as tumors or AIDS. The interviewer conducted one-on-one, face-to-face surveys. Before each interviewee filled out the questionnaire, they were asked about the exclusion criteria mentioned above. If any of the exclusion criteria applied, the interviewee was actively excluded and not interviewed. As a result, all 1755 questionnaires were deemed valid.

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Participants signed informed consent forms, which are complied with the Helsinki Declaration and approved by the ethics committee.

Procedures

Randomization. The research team drew a random sample. Interviewers visited communities of Jilin Province and selected one interviewee out of five individuals to conduct a questionnaire investigation of residents meeting the inclusion and exclusion criteria in Jilin, China;

Data Collection. All interviewers had a bachelor's degree or higher in a TCM-related major. The research team utilized a face-to-face dialogue during the questionnaire survey. Immediately after each interview, the survey questionnaires were organized and carefully examined for completeness and accuracy. If any issues were unclear, the interviewees would be contacted through telephone follow-up to insure the accuracy of the survey. The research team members entered the questionnaire data with a two-person dual-input approach, employing manual verification and logic checks. Logical consistency checked and cross-referencing with the source material were conducted to rectify any inconsistencies found in the entered data. The research team collected the questionnaires and tabulated the data. The research team utilized a face-to-face dialogue during the questionnaire survey. Immediately after each interview, the survey questionnaires were organized and carefully examined for completeness and accuracy. If any issues were unclear, the interviewees would be contacted through telephone follow-up to ensure the accuracy of the survey. The research team members entered the questionnaire data with a two-person dual-input approach, employing manual verification and logic checks. Logical consistency checked and cross-referencing with the source material were conducted to rectify any inconsistencies found in the entered data.

Questionnaires. To evaluate participants' circumstances, the research team used three component questionnaires: (1) the first section covered sociodemographic information, such as gender, age, employment status, and educational level; (2)

the second section discussed factors that can influence everyday life according to TCM theory, such as exercise, sleep, diet, and medical history; (3) the third portion was the Constitution in Chinese Medicine Questionnaire (CCMQ).⁴²⁻⁴⁴

Outcome Measures. The research team: (1) collected participants' data using a basic informational and lifestyle questionnaire and the Constitution in Chinese Medicine Questionnaire (CCMQ); (2) used descriptive analysis to illustrate demographic characteristics and the distribution of TCM constitutions; (3) conducted multivariate logistic regressions to explore potential factors influencing the Deficiency, Excess, Gentleness, and Special-diathesis constitutions.

Logistic regression analysis. The research team used the Chi-square test (χ^2), independent samples t-test, or one-way analysis of variance (ANOVA) to perform univariate analysis of the relationship between each influencing factor and a single TCM constitution, as appropriate.

The research team chose the factors with $p < 0.05$ in the univariate analysis as the candidate variables for the SPSS 26.0 stepwise, logistic regression analysis. The dependent variables, y_1 – y_9 , corresponded to the nine constitutions, and all participants matched one or more of them.

The team used a dummy variable as the independent variable— $x=0$ was no, and $x=1$ was yes. The team obtained backward logistic regression (LR) data and used it to screen independent variables ($p=0.05$), and measured the relative risk ratio and 95 percent confidence interval (CI).

Outcome Measures

Demographic characteristics, lifestyles, and health histories. For the CCMQ, the research team normalized each subscale's score from 0 to 100. The Gentleness constitution was defined as the perfect and stable state, with the body constitution in Yin-Yang equilibrium, with no excess or deficiency of Yin and Yang. Gentleness, a balanced constitution, earns a high score, reflecting its status of strength. The other eight constitutions are pathological constitutions, with higher scores suggesting a poorer health state.

For the basic parameters: CCMQ, developed by Wang et al. which includes 60 items, in which items of nine subscales (each subscale consists of 7–8 items) are interspersed irregularly.^{2,44,45} For each item, an appropriate answer was selected from a Likert scale (“no,” “occasionally,” “sometimes,” “often,” and “always,” scored 1–5). For each subscale, the original score was first calculated (original score = sum of the scores for each item) and then converted into the transition score [(original score - number of subscale items)/(number of subscale items \times 4) \times 100]. The transition score of each subscale ranged from 0–100 points. Gentleness constitution referred to the participants with transition scores of the eight biased constitutions being < 30 points, and the transition score of the Gentleness constitution being ≥ 60 points. A biased constitution was diagnosed if the transition score of any constitution was ≥ 40 points.

Participants with no medical history were described as: (1) having no history of physical diseases and (2) having no

serious mental illness that cannot be good in self-evaluation. Sixty-five percent of participants were thus described as being in good health with no medical history, participants with allergies were extremely rare (0.6 percent).

Constitution types. The eight bias constitutions are Qi-deficiency, Yang-deficiency, Yin-deficiency, Phlegm-dampness, Dampness-heat, Blood-stasis, Qi-depression, and Special diathesis Constitution. Deficiency constitutions included Qi-deficiency, Yang-deficiency and Yin-deficiency constitutions; Excess constitutions are included, Phlegm-dampness, Dampness-heat, Blood-stasis and Qi-depression constitutions.

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Univariate and multivariate analyses. The research team used ANOVA and multivariate logistic regression analysis to determine whether demographic, lifestyle and background characteristics were influencing factors for TCM constitutions.

Statistical Analysis

The research team analyzed the data using the Statistical Product and Service Solutions (SPSS) 26.0 software (IBM, Chicago, IL, USA). The team expressed counting data as numbers (N) and percentages (%), used multivariate logistic regression (MLR) and backward LR selection to describe the relationship between the nine TCM constitutions and participants' backgrounds and lifestyles. $P < .05$ indicated statistical significance.

RESULTS

Participants

Table 1 shows that the study included and analyzed the data of 1755 residents, 794 men (45.2%) and 961 women (54.8%). Regarding age, 595 participants were 45-55 year of age (33.9%); 418 were 56-65 (23.8%); 327 were 66-75 (18.6%); 287 were 36-45 (16.4%); 126 were 26-35 (7.2%); and two were 16-25 (0.1%)

Lifestyles

Table 2 shows the characteristics of the participants' lifestyles—sleep, exercise, diet, smoking, and drinking. For sleep type, 725 participants had early bedtimes and rising times (41.3%); 385 had late bedtimes and early rising times (21.9%); 269 had irregular bedtimes and rising times (15.3%); 264 had late bedtimes and rising times (15.0%); 81 had early bedtimes and late rising times (4.6%); and 37 had reversed bedtimes and rising times (1.9%).

For exercise, 610 exercised excessively (34.8%); 460 regularly exercised (26.2%); and 685 didn't participate much in exercise (39%).

For diet, 613 had a sweet diet (34.9%); 612 had a light diet (34.9%); 606 had a spicy diet (34.5%); 432 had a sour diet

Table 1. Participants’ Demographic Characteristics (N = 1755)

Characteristics	n (%)
Gender	
Male	794 (45.2)
Female	961 (54.8)
Age	
16-25	2 (0.1)
26-35	126 (7.2)
36-45	287 (16.4)
46-55	595 (33.9)
56-65	418 (23.8)
≥66	327 (18.6)
Marriage	
Unmarried	428 (24.4)
Married	1327 (75.6)
Occupation	
Professionals and technical personnel	348 (19.7)
Managers and administrators	75 (4.3)
Clerical staff	155 (8.8)
Service workers	77 (4.4)
Production	301 (17.2)
Transport, labor, and equipment operator	208 (11.9)
Soldier	5 (0.3)
Student	152 (8.7)
Retired or not employed	295 (16.8)
Others	139 (7.9)
Education	
Below primary school	75 (4.3)
Primary school	234 (13.3)
Lower secondary	411 (23.4)
Upper secondary or specialized secondary	468 (26.7)
Sub-degree course	223 (12.7)
Undergraduate	306 (17.4)
Postgraduate or above	38 (2.2)
Blood Type	
Type A	293 (16.6)
Type B	240 (13.6)
Type O	390 (22.1)
Type AB	282 (16.6)
Unknown	550 (31.1)

Table 2. Participants’ Lifestyles—Sleep, Exercise, Diet, Alcohol, and Smoking (N = 1755)

Characteristics	n (%)
Sleep Type	
Early bedtime and rising time	725 (41.3)
Late bedtime and rising time	264 (15.0)
Early bedtime, late rising time	81 (4.6)
Late bedtime, early rising time	385 (21.9)
Irregular	269 (15.3)
Sleep reversed	31 (1.9)
Exercise	
Regular exercise	460 (26.2)
Excessive exercise	610 (34.8)
Not much exercise	685 (39.0)
Diet ^a	
Sweet	613 (34.9)
Spicy	606 (34.5)
Sour	432 (24.1)
Salty	383 (21.8)
Light	612 (34.9)
Greasy	276 (15.7)
Barbecue	232 (13.2)
Prefer cold food	227 (12.9)
Prefer hot food	335 (19.1)
Smoking	
Yes	401 (22.8)
No	1354 (77.2)
Alcohol	
Yes	297 (16.9)
No	1458 (83.1)

^aParticipants could choose more than one type of diet

(24.1); 383 had a salty diet (21.8%); 276 had a greasy diet (15.7%); and 232 had a barbecue diet (13.2%). 335 preferred hot diet (19.1%), and 227 preferred cold food (12.9%). Of the 1755 participants, 401 smoked (22.8%), and 297 drank alcohol (16.9%).

Health History

Of the 1755 participants (Table 3), 1144 had no history of disease (65.2%) and 611 had a medical history (34.8%). Of all 1755 participants, 188 had cardio-cerebrovascular disease (10.7%); 157 had hypertension (8.9%); 83 had gastric ulcers (4.7%); 59 had hyperlipidemia (3.4%); 47 had diabetes (2.7%); 40 had liver disease (2.3%); 34 had had a traumatic injury (1.9); 31 had chronic bronchitis (1.8%); 18 had osteoporosis (1.1%); 17 had had a stroke (1.0%); 17 were corpulent (1.0%); 11 had allergies (0.6%); 7 had cancer (0.4%); and 3 had a mental disease (0.2%).

TCM Constitution Types

Table 4 shows the number of participants who had each TCM constitution. Of the 1755 participants, 757 had the Gentleness constitution (43.1%), As for an unbalanced

constitution, 194 participants had a Qi-deficiency constitution (11.1%); 177 participants had a Yang-deficiency constitution (10.1%); 143 had a Qi-depression constitution (8.1%); 130 had a Yin-deficiency constitution (7.4%); 103 had a Dampness-heat constitution (5.9%); 93 had a Phlegm-dampness constitution (5.3%); 84 had a Blood-stasis constitution (4.8%); and 74 had a Special diathesis constitution (4.2%).

Figure 3 shows that the number of participants with Excess constitutions (24.1%) was slightly lower than that of participants with Deficiency constitutions (28.6%), and the number of participants with Special-diathesis constitution was the smallest at 4.2%.

The top two unbalanced types were the Qi-deficiency and Yang-deficiency constitutions, followed by Qi-depression, Yin-deficiency, Dampness-heat, Phlegm-dampness, Blood-stasis, and Special-diathesis constitutions. Among the unbalanced constitutions, the Qi-deficiency and Qi-depression constitutions were the most common Deficiency and Excess constitutions, respectively.

Although the number of participants with Excess constitutions was slightly lower than the number with Deficiency constitutions, the number of participants with the

Table 3. Participants’ Medical and Family Histories (N = 1755). Participants with no medical history were described as: (1) having no history of physical diseases and (2) having no serious mental illness that could cause issues in self-evaluation, with 65.2% of participants described as being in good health with no medical history. For the diseases, N = 1755 also to measure the incidence of the disease in the entire population.

Characteristics	n (%)
No Medical History	1144 (65.2%)
Medical Histories	611 (34.8%)
Hypertension	
Yes	157 (8.9)
No	1598 (91.1)
Hyperlipidemia	
Yes	59 (3.4)
No	1696 (96.6)
Diabetes	
Yes	47 (2.7)
No	1708 (97.3)
Liver Disease	
Yes	40 (2.3)
No	1715 (97.7)
Gastric Ulcers	
Yes	83 (4.7)
No	1672 (95.3)
Cancer	
Yes	7 (0.4)
No	1748 (99.6)
Cardio-cerebrovascular Disease	
Yes	188 (10.7)
No	1567 (89.3)
Stroke	
Yes	17 (1.0)
No	1738 (99.0)
Osteoporosis	
Yes	18 (1.1)
No	1737 (98.9)
Corpulence	
Yes	17 (1.0)
No	1738 (99.0)
Chronic Bronchia	
Yes	31 (1.8)
No	1724 (98.2)
Traumatic Injury	
Yes	34 (1.9)
No	1721 (98.1)
Mental Disease	
Yes	3 (0.2)
No	1752 (99.8)
Allergies	
Yes	11 (0.6)
No	1744 (99.4)

Blood-stasis, Dampness-heat, and Phlegm-dampness constitutions was very similar.

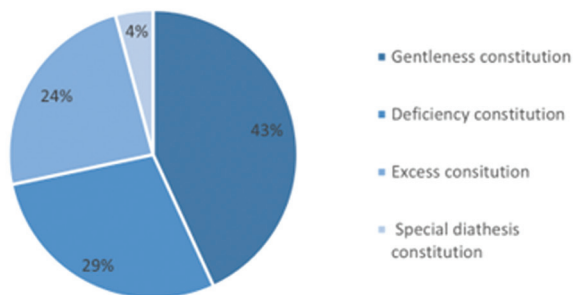
Unbalanced TCM and Influencing Factors

ANOVA. Table 5 shows the factors influencing the TCM constitutions from the ANOVA analysis. The Gentleness constitution was significantly related to a greasy diet ($P = .009$), to alcohol ($P = .033$), and to exercise ($P = .002$).

Table 4. Participants’ TCM Constitutions (N = 1755)

TCM Constitutions	n (%)
Gentleness	757 (43.1)
Qi-deficiency	194 (11.1)
Yang-deficiency	177 (10.1)
Yin-deficiency	130 (7.4)
Phlegm-dampness	93 (5.3)
Dampness-heat	103 (5.9)
Blood-stasis	84 (4.8)
Qi-depression	143 (8.1)
Special diathesis	74 (4.2)

Figure 3. Distribution of TCM Constitutions in Jilin Province, China



The Qi-deficiency constitution was significantly related to a sweet diet ($P = .023$), to sleep habits ($P = .003$) to exercise ($P = .002$), to diabetes ($P = .039$), to gastric ulcers ($P = .012$), to corpulence ($P = .012$), and to chronic bronchia ($P = .004$).

The Yang-deficiency constitution was closely related to female gender ($P = .000$), age ($P = .043$), a spicy diet ($P = .038$), prefer to hot food ($P = .000$), smoking ($P = .004$), alcohol ($P = .000$), sleep habits ($P = .002$), and blood type ($P = 0.001$).

The Yin-deficiency constitution was significantly related to gender ($P = .024$), to being 46-65 years of age ($P = .001$), education ($P = .04$), to prefer to cold food ($P = .022$), to a barbecue diet ($P = .000$), and to hypertension ($P = .002$).

The Phlegm-dampness constitution was significantly related to occupation ($P = .008$), to prefer to hot food ($P = .034$), exercise ($P = .005$), hypertension ($P = .001$), hyperlipidemia ($P = .002$), diabetes ($P = .049$), and cardio-cerebrovascular disease ($P = .000$).

The Dampness-heat constitution was significantly related to prefer to cold food ($P = .044$), to liver disease ($P = .023$), corpulence ($P = .000$), diabetes ($P = .011$), cardio-cerebrovascular disease ($P = .002$), osteoporosis ($P = .005$), and mental disease ($P = .004$).

The Blood-stasis constitution was significantly related to gender ($P = .000$), a greasy diet ($P = .012$), alcohol ($P = .001$), sleep habits ($P = .02$), exercise ($P = .014$), cardio-cerebrovascular disease ($p = 0.000$), osteoporosis ($P = .008$), hypertension ($p = 0.034$), and hyperlipidemia ($P = .000$).

The Qi-depression constitution was significantly related to gender ($P = .000$), occupation ($P = .000$), smoking ($P = .000$), alcohol ($P = .000$), exercise ($P = .003$), chronic bronchia ($P = .013$), hyperlipidemia ($P = .031$), and liver disease ($P = .000$).

Table 5. Relationship Between TCMC Types and Significant Influencing Factors, based on a multiple-factor ANOVA

Variables	SS	MS	F	P value	Variables	SS	MS	F	P value
Gentleness Constitution					Hyperlipidemia	0.303	0.303	9.371	.002 ^b
Greasy diet	0.907	0.907	6.862	.009 ^b	Diabetes	0.101	0.101	3.868	.049 ^a
Barbecue diet	1.261	1.261	11.052	.051	Cardio-cerebrovascular disease	2.615	2.615	27.729	.000 ^c
Alcohol	0.637	0.637	4.536	.033 ^a	Dampness-heat Constitution				
Exercise	5.811	5.811	10.036	.002 ^b	Prefer to cold food	0.459	0.459	4.078	.044 ^a
Qi-Deficiency Constitution					Liver disease	0.115	0.115	5.156	.023 ^a
Sweet diet	1.173	1.173	5.172	.023 ^a	Corpulence	0.135	0.135	14.131	.000 ^c
Smoking	1.705	1.705	9.715	.052	Diabetes	0.337	0.337	6.537	.011 ^a
Sleep	21.095	21.095	8.556	.003 ^b	Cardio-cerebrovascular disease	1.158	1.158	10.069	.002 ^b
Exercise	6.951	6.951	12.03	.002 ^b	Osteoporosis	0.023	0.023	8.048	.005 ^b
Diabetes	0.111	0.111	4.261	.039 ^a	Mental disease	0.051	0.051	8.15	.004 ^b
Gastric ulcers	0.283	0.283	6.299	.012 ^a	Blood-stasis Constitution				
Corpulence	0.06	0.06	6.252	.012 ^a	Gender	7.351	7.351	30.154	.000 ^c
Chronic bronchia	0.146	0.146	8.451	.004 ^b	Greasy diet	0.837	0.837	6.331	.012 ^a
Yang-Deficiency Constitution					Alcohol	1.436	1.436	10.264	.001 ^b
Gender	11.826	11.826	49.024	.000 ^c	Sleep	13.285	13.285	5.379	.02 ^a
Age	5.514	5.514	4.093	.043 ^a	Exercise	3.552	3.552	6.108	.014 ^a
Spicy diet	0.974	0.974	4.314	.038 ^a	Cardio-cerebrovascular disease	1.375	1.375	14.473	.000 ^c
Prefer to hot food	2.526	2.526	16.493	.000 ^c	Osteoporosis	0.072	0.072	7.146	.008 ^b
Smoking	1.457	1.457	8.296	.004 ^b	Hypertension	0.617	0.617	4.506	.034 ^a
Alcohol	1.958	1.958	14.022	.000 ^c	Hyperlipidemia	0.458	0.458	15.484	.000 ^c
Sleep	23.134	23.134	9.388	.002 ^b	Qi-depression Constitution				
Blood type	22.398	22.398	10.901	.001 ^b	Gender	13.676	13.676	56.938	.000 ^c
Yin-Deficiency Constitution					Occupation	135.412	135.412	14.459	.000 ^c
Gender	1.262	1.262	5.105	.024 ^a	Smoking	2.15	2.15	12.266	.000 ^c
Age	13.993	13.993	10.424	.001 ^b	Alcohol	3.567	3.567	25.715	.000 ^c
Education	9.174	9.174	4.23	.04 ^a	Exercise	4.987	4.987	8.599	.003 ^b
Prefer to cold food	0.591	0.591	5.261	.022 ^a	Chronic bronchia	0.107	0.107	6.19	.013 ^a
Barbecue diet	51.899	51.899	21.205	.000 ^c	Hyperlipidemia	0.139	0.139	4.682	.031 ^a
Hypertension	1.254	1.254	9.183	.002 ^b	Liver disease	0.283	0.283	12.79	.000 ^c
Phlegm-dampness Constitution					Special Diathesis Constitution				
Occupation	65.362	65.362	6.95	.008 ^b	Allergies	3.589	3.589	29.17	.000 ^c
Prefer to hot food	0.693	0.693	4.493	.034 ^a	Cancer	0.031	0.031	7.719	.006 ^b
Exercise	4.507	4.507	7.765	.005 ^b	Liver disease	0.097	0.097	4.347	.037 ^a
Hypertension	0.882	0.882	10.878	.001 ^b	Chronic bronchia	0.175	0.175	4.137	.042 ^a

^a $P < .05$, indicating that alcohol was significantly correlated with the gentleness constitution; that a sweet diet, diabetes, gastric ulcers, and corpulence were significantly correlated with the Qi-deficiency constitution; that age and a spicy diet were significantly correlated with the Yang-deficiency constitution; that gender, education, and cold extremities were significantly correlated with the Yin-deficiency constitution; that prefer to hot food and diabetes were significantly correlated with the Phlegm-dampness constitution; that prefer to cold food, liver disease, and diabetes were significantly correlated with the Dampness-heat constitution; that a greasy diet, sleep habits, exercise, and hypertension were significantly correlated with the Blood-stasis constitution; that chronic bronchia and hyperlipidemia were significantly correlated with the Qi-depression constitution; and that liver disease and chronic bronchia were significantly correlated with the Special Diathesis constitution

^b $P < .01$, indicating that a greasy diet and exercise were significantly correlated with the gentleness constitution; that a sleep, exercise, and chronic bronchia were significantly correlated with the Qi-deficiency constitution; that smoking, sleep, and blood type were significantly correlated with the Yang-deficiency constitution; that age and hypertension were significantly correlated with the Yin-deficiency constitution; that occupation, exercise, hypertension, and hyperlipidemia were significantly correlated with the Phlegm-dampness constitution; that cardio-cerebrovascular disease, osteoporosis, and mental disease were significantly correlated with the Dampness-heat constitution; that alcohol and osteoporosis was significantly correlated with the Blood-stasis constitution; that exercise was significantly correlated with the Qi-depression constitution; and that cancer was significantly correlated with the Special Diathesis constitution

^c $P < .001$, indicating that gender, prefer to hot food, and alcohol were significantly correlated with the Yang-deficiency constitution; that a barbecue diet was significantly correlated with the Yin-deficiency constitution; that cardio-cerebrovascular disease was significantly correlated with the Phlegm-dampness constitution; that corpulence was significantly correlated with the Dampness-heat constitution; that gender, cardio-cerebrovascular disease, and hyperlipidemia were significantly correlated with the Blood-stasis constitution; that gender, occupation, smoking, alcohol, and liver disease were significantly correlated with the Qi-depression constitution; and that allergies were significantly correlated with the Special Diathesis constitution

Table 6. Association of TCMC Type and Significant Influencing Factors, from the Multiple Logistic Regression. The research team chose the factors with $P < .05$ in the univariate analysis as the candidate variables for the SPSS 26.0 stepwise, logistic regression analysis. The dependent variables, y1–y9, corresponded to the nine constitutions.

Variable	Coefficient	SE	Wald	P value	OR	95% CI for exp
Gentleness Constitution						
Greasy diet	0.515	0.166	9.605	.002 ^b	1.674	(1.209, 2.320)
Qi-Deficiency Constitution						
Excessive exercise	0.549	0.194	10.046	.002 ^b	1.848	(1.264, 2.702)
Chronic bronchia	0.974	0.456	4.555	.033 ^a	2.648	(1.083, 6.477)
Yang-Deficiency Constitution						
Female	0.633	0.158	15.991	.015 ^a	1.883	(1.381, 2.567)
Prefer to hot food	0.57	0.171	11.161	.001 ^b	1.769	(1.266, 2.472)
Yin-Deficiency Constitution						
Age ≥66	0.965	0.567	74	.000 ^c	1.166	(3.841, 3.539)
Age 56-65	0.065	0.283	35.436	.000 ^c	3.877	(2.228, 6.748)
Age 46-55	0.979	0.223	52.066	.000 ^c	4.228	(2.733, 6.539)
Barbecue diet	1.047	0.231	20.528	.000 ^c	2.848	(1.811, 4.479)
Phlegm-Dampness Constitution						
Cardio-cerebrovascular disease	1.386	0.25	30.686	.000 ^c	3.998	(2.449, 6.528)
Hyperlipidemia	0.516	0.263	3.837	.05 ^a	1.675	(1, 2.808)
Dampness-Heat Constitution						
Liver disease	1.05	0.356	8.702	.003 ^b	2.857	(1.422, 5.738)
Osteoporosis	2.197	0.97	5.131	.024 ^a	8.997	(1.344, 60.202)
Blood-Stasis Constitution						
Cardio-cerebrovascular disease	0.605	0.191	10.003	.002 ^b	1.831	(1.259, 2.663)
Hyperlipidemia	0.823	0.322	6.511	.011 ^a	2.277	(1.21, 4.283)
Qi-Depression Constitution						
Chronic bronchia	1.576	0.458	11.855	.001 ^b	4.837	(1.972, 11.865)
Liver disease	1.352	0.446	9.174	.002 ^b	3.865	(1.611, 9.27)
Special Diathesis Constitution						
Allergies	1.174	0.235	24.878	.000 ^c	3.236	(2.024, 5.133)

^a $P < .05$, chronic bronchia was significantly correlated with the Qi-deficiency constitution; that the female gender was significantly correlated with the Yang-deficiency constitution; that hyperlipidemia was significantly correlated with the Phlegm-dampness constitution; that osteoporosis was significantly correlated with the Dampness-heat constitution; and that hyperlipidemia was significantly correlated with the Blood-stasis constitution

^b $P < .01$, indicating that a greasy diet was significantly correlated with the gentleness constitution; that excessive exercise was significantly correlated with the Qi-deficiency constitution; that the female gender was significantly correlated with the Yang-deficiency constitution; that liver disease was significantly correlated with the Dampness-heat constitution; that cardio-cerebrovascular disease was significantly correlated with the Blood-stasis constitution; that chronic bronchia and liver disease were significantly correlated with the Qi-depression constitution; and that allergies were significantly correlated with the Special Diathesis constitution

^c $P < .001$, indicating that an age ≥66, an age 56-65, an age 46-55, and a barbecue diet were significantly correlated with the Yin-deficiency constitution; that cardio-cerebrovascular disease was significantly correlated with the Phlegm-dampness constitution; and that allergies were significantly correlated with the Special Diathesis constitution

The Special Diathesis constitution was significantly related to allergies ($P = .000$), cancer ($P = .006$), liver disease ($P = .037$), and chronic bronchia ($P = .042$).

Multiple logistic regression. Table 6 shows the factors influencing the TCM constitutions from the multiple logistic regression. The Gentleness constitution was significantly related to a greasy diet ($P = .002$).

The Qi-deficiency constitution was significantly related to excessive exercise ($P = 0.002$) and chronic bronchia ($P = .033$). The Yang-deficiency constitution was closely related to female gender ($P = .015$) and prefer to hot food ($P = .001$). The Yin-deficiency constitution was significantly related to an age ≥66 ($P = .000$), to an age between 56 and 65

($P = .000$), to an age between 46 and 55 ($P = .000$), and to a barbecue diet ($P = .000$).

A dissimilar tendency occurred for Excess constitutions. They were associated with medical history. Both the Phlegm-dampness constitution and the Blood-stasis constitution were related to cardio-cerebrovascular disease, with $P = .000$ and $P = .002$, respectively, and hyperlipidemia with $P = .05$ and $P = .011$, respectively.

The Dampness-heat constitution was significantly related to liver disease ($P = .003$) and osteoporosis ($P = .024$). The Qi-depression constitution was significantly related to liver disease ($P = .002$) and chronic bronchia ($P = .001$). The Special-diathesis constitution was significantly related to allergies.

DISCUSSION

To the current research team's knowledge, this was the first large-scale, population-based study in the North of China, and it has provided the key factors for TCM constitutions, including factors such as gender, age, diet, exercise, sleep patterns, and disease histories for TCM constitution in Jilin province.

The current study found that the most common unbalanced TCM constitutions in Jilin were Deficiency constitutions (28.6%), Excess constitutions (24.1%), and Special-diathesis constitutions (4.2%). According to TCM constitution theory, this result suggests that the participants with unbalanced constitutions didn't have normal health.

The top two unbalanced types were the Qi-deficiency and Yang-deficiency constitutions, followed by Qi-depression, Yin-deficiency, Dampness-heat, Phlegm-dampness, Blood-stasis, and Special-diathesis constitutions. The distribution of the two dominant unbalanced TCM constitution forms—Qi-deficiency and Yang-deficiency—may be closely related to prolonged low temperatures of Jilin. The current study's findings agree with those of previous investigations in China.^{6,11,34}

The current study found that Deficiency constitutions were related to lifestyles. It showed that after the age of 35, the body's functioning appears to have a deficiency of Yin and excessive amount of Yang. It is agree to the traditional Chinese medicine theory, such as the *Yellow Emperor's Canon of Medicine*¹. The current study found that one factor for the Yin-deficiency constitution was a preference for a barbecue diet and for the Qi-deficiency constitution was related to excessive exercise and chronic bronchia. The unhealthy diet and chronic bronchia may refer to the contemporary food quality issues, which was that excessive use of chemical fertilizers and pesticides on crops, and people frequently consuming high-calorie foods with unhealthy cooking methods. Qi-deficiency constitution is in low energy state, based on the unhealthy diet, excessive physical exercise can lead to the formation of the qi-deficiency. It is consistent with the previous studies.

The Phlegm-dampness and Blood-stasis constitutions were related to hyperlipidemia and cardio-cerebrovascular patients. The main reasons for hyperlipidemia are improper diet and lack of exercise. Unhealthy diet and exercise pattern can lead to a decrement in energy metabolism and generate products of the Phlegm-dampness constitution, and that constitution shares the characteristics of metabolism disorders with the Blood-stasis constitution.

The current study also found that the Phlegm-dampness and Blood-stasis constitutions were related to hyperlipidemia and the Dampness-heat constitution was related to liver disease and osteoporosis, it is consistent to studies.²⁰⁻²²

The current study had some limitations: (1) the questionnaires were self-reported instruments; (2) although the research team assured anonymity and confidentiality and the researchers were professionals trained to ask questions during the research, the study may not have been entirely free of desirability bias, especially in the case of mental diseases;

(3) future studies should consider psychological factors because TCM constitution theory is a synthesis of human nature and society. Future studies could also build models to investigate the transformation of the TCM constitution.

CONCLUSIONS

The identification of TCM constitutions would be beneficial to early identification of potential risk factors and could contribute to the creation of more comprehensive guidelines for health organizations. Controlling the factors influencing the TCM constitutions and using health management plans based on the TCM constitution could help people with unbalanced constitutions to adjust their lifestyles and improve their health.

DATA AVAILABILITY

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

AUTHORS' DISCLOSURE STATEMENT

The Administration of Traditional Chinese Medicine of Jilin Province in Jilin, China (Award Number: 2019019) funded the study. The authors declare that they have no conflicts of interest related to the study.

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