



Original Article

Constitution of traditional chinese medicine and related factors in women of childbearing age

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Abstract

Background: This study investigates the constitution of traditional Chinese medicine (TCM) among women who want to be pregnant in one year and explores factors related to TCM constitution.

Methods: This study was conducted on women who participated in free preconception check-ups provided by the Zhabei District Maternity and Child Care Center in Shanghai, China. The information regarding the female demographic characteristics, physical condition, history of pregnancy and childbearing, diet and behavior, and social psychological factors was collected, and TCM constitution assessment was performed. The Chi-square test, t-test, logistic regression analysis, and multinomial logistic regression analysis were used to explore the related factors of TCM constitution.

Results: The participants in this study were aged 28.3 ± 3.0 years. Approximately fifty-five women in this study had Unbalanced Constitution. Logistic regression analysis showed that Shanghai residence, dysmenorrhea, gum bleeding, aversion to vegetables, preference for raw meat, job stress, and economic stress were significantly and negatively associated with Balanced Constitution. Multinomial logistic analysis showed that Shanghai residence was significantly associated with Yang-deficiency, Yin-deficiency, and Stagnant Qi Constitutions; gum bleeding was significantly associated with Yin-deficiency, Stagnant Blood, Stagnant Qi, and Inherited Special Constitutions; aversion to vegetables was significantly associated with Damp-heat Constitution; job stress was significantly associated with Yang-deficiency, Phlegm-dampness, Damp-heat, Stagnant Blood, and Stagnant Qi Constitutions; and economic stress was significantly associated with Yang-deficiency, and Stagnant Qi Constitutions.

Conclusion: The application of TCM constitution to preconception care would be beneficial for early identification of potential TCM constitution risks and be beneficial for early intervention (e.g., health education, and dietary education), especially during the women who do not have a medical condition and those who have related factors found in this study.

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Keywords: Body constitution; Chinese traditional medicine; Preconception care; Risk factors; Women

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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1. Introduction

The health of women of childbearing age has been concerned for years. Prenatal care and neonatal care may be too late and insufficient to achieve primary prevention of adverse outcomes,^{1–3} so preconception care was used to supplement and increase the likelihood of a desire and healthy pregnancy and a healthy infant by providing timely and exact information and intervention.^{4,5} As we know, modern medicine is better at serving for people with medical conditions, and there are currently no targeted measures for sub-health. In female health care, based on the modern medicine, there are several unanswered questions: ①Why do women with similar demographic and medical characteristics, as assessed by modern medicine, have different pregnancy symptoms and outcomes? That is, why do some women maintain comfortable and favorable conditions during pregnancy while others develop uncomfortable and adverse events? ②How provide personalized health care services for women with similar demographic and medical characteristics? ③How provide personalized health care services for women do not have medical conditions? Personalized health care services would be more acceptable.

The Chinese concept of constitution (i.e., the constitution of traditional Chinese medicine (TCM)) is an indigenous construct that serves as part of an explanatory model for understanding various aspects of life, including physical well-being. Constitution (i.e., *ti-zhi*) is a widely used term in China. Literally, *ti* means body and *zhi* denotes quality or substance. TCM takes a global and dynamic view of human differences, believes that constitution is partly genetically determined and partly acquired, and classifies individuals' constitution into nine types based on Chinese medical theory, multidisciplinary studies, and clinical practice. Therefore, the results can be used in disease prevention and cure, and rehabilitative care.^{6,7} According to the shape of the human body, function, psychology, and other characteristics, individual constitution can be assessed by the Constitution in Chinese Medicine Questionnaire (CCMQ) developed by Wang et al.^{8–10} One type is Balanced Constitution (i.e., a normal constitution, with fine lustrous complexion, a good sleep, a good appetite, and good defecation), and the following eight types represent unbalanced constitutions: Qi-deficiency, Yang-deficiency, Yin-deficiency, Phlegm-dampness, Damp-heat, Stagnant Blood, Stagnant Qi, and Inherited Special Constitutions. Unbalanced constitution means disharmony and can be viewed as an individual's susceptibility to specific disease or symptoms. Various types of constitution show various characteristics. For example, *People with Qi-deficiency and Yang-deficient* both are physically weak with loose muscle, weak voice, easily feel tired and sweat spontaneously. Compared to Qi-deficiency, Yang-deficiency is more susceptible to getting common cold. They often have a cold sensation in part or whole body and do not like staying in air-conditioned room, and feel uncomfortable (e.g., abdominal distention, diarrhea) after eating cold food or drinks. *People with Yin-deficiency* mostly look thin and tall, often suffer from feverish sensation in the cheeks, soles and palms, aversion to summer-heat and have dry eyes and skin.

They are often thirsty and suffer from constipation and insomnia. *People with Phlegm-dampness* are usually obese especially in the abdominal area. They usually suffer from greasy sweat, and heaviness of legs with a sticky and sweet taste in the mouth and phlegm in the throat. *People of Damp-heat* constitution may have oily skin particularly in the face and the tip of nose, acne, itchy skin, foul breath, sticky stools and slow bowels movement, irritability. *People of Stagnant Blood constitution* have a dark facial complexion with purplish mouth and lips, rough skin, bloodshot eyes and bruises easily. They are forgetful and impatient with a quick temper. Most of *people of Stagnant Qi constitution* are thin and often feel gloomy or depressed, easy to be nervous, anxious, and sensitive. The *Inherited Special constitution* is a quite special. These people are vulnerable to many factors and environmental changes. They sneeze very often and have a running stuffy nose, and sometimes suffer from asthma, urticaria or skin eruptions.

TCM recognizes constitution as a specific etiologic factor in many diseases. And in situations where the etiology of a perceived health problem is not clear, constitution becomes the obvious instructive explanation. The theory of TCM constitution provides personalized services for all women in the following three aspects. First, people have different constitutions even if they have similar demographic and medical characteristics¹¹; Second, different constitutions require different treatments (i.e., different food due to different food properties, different guidance on work and rest and on exercise regimen, and different Chinese herbs)^{6,7,9}; Additionally, different foods that provide similar nutrients may not have the same TCM natures, so due to different food properties, people should choose better foods according to their constitutions.^{6,7,9}

According to TCM theory, women with unbalanced constitutions at higher risk of uncomfortable symptoms and adverse outcomes because they cannot adapt well to the physiological and psychological changes accompanied with pregnancy and delivery. Qi and Blood deficiency are disadvantages of menstruation, pregnancy and childbearing and influence both maternal health and foetal/new-born health.^{12,13} It was reported that a new-born whose parents suffer from asthma, and/or have an allergic constitution are at risk to develop bronchial asthma.¹⁴ Additionally, Unbalanced constitution is closely related to discomfort symptoms during the first trimester of pregnancy, i.e., frequent urination, fatigue, heavy vaginal discharge, nausea, vomiting, mood swings, nasal congestion, dizziness; and breast tenderness are significantly positively correlated with the constitutions of Yin-deficiency, Yang-deficiency, and Phlegm-dampness.¹⁵ And Unbalanced constitution in the first trimester was also closely related to severe nausea and vomiting and poor sleep during pregnancy.¹⁶ So, the identification of TCM constitution during women of childbearing age may help to understand and find risk characteristics of uncomfortable and adverse pregnant outcomes.

As a complementary medicine, TCM, which includes diet, Chinese herbs, and acupuncture, has been widely used¹⁷ and has been demonstrated to be effective in disease prevention and treatment.^{18–20} Therefore, it is feasible to integrate the TCM constitution theory into preconception care. Seeking

further understanding and data on female health, this study investigated the constitution of women who want to be pregnant within one year, and explored associated factors of various TCM constitutions.

2. Methods

This cross sectional study was conducted in the Zhabei District Maternity and Child Care Center in Shanghai, China. Ethics committee of Tongji University Medicine and Life Science Unit specifically approved this study (Num.: 2013-yxy07), and written informed consent was obtained from all participants prior to study initiation.

2.1. Participants

All women aged 18–49 years, who lived in the Zhabei district, who wanted to become pregnant within one year and who received free physical check-ups provided by Zhabei District Maternity and Child Care Center in Shanghai, China, were invited to participate in this study between May and December 2013. All women were asked to complete a basic information questionnaire and an assessment of their TCM constitution. All questionnaires were answered with real names so that the women could accept counseling at a later time, and each participant had the right to join or drop out during the entire study process.

Women who did not provide all of the information required in this study were excluded. Amongst the 724 women who received preconception check-ups, 16 (2.2%) cases were removed from the analysis because of incomplete information (eight cases of incomplete information on the CCMQ and eight cases of more than ten percent incomplete data on the basic information questionnaire).

2.2. Research instruments

In this study, the research instruments included the Constitution in Chinese Medicine Questionnaire (CCMQ)^{8–10} and a baseline information questionnaire. All instruments were developed based on a literature review and expert validity.

CCMQ, developed by Wang et al.^{8–10} is a 60-item, 5-point Likert scale (from 1 (almost not) to 5 (always happen)) and was used to measure the female constitution. It is composed of nine independent constitution subscales including one Balanced Constitution and eight unbalanced constitutions: Qi-deficiency, Yang-deficiency, Yin-deficiency, Phlegm-dampness, Damp-heat, Stagnant Blood, Stagnant Qi, and Inherited Special Constitutions. If the subscale of balanced constitution scores greater than or equal to 60 and all the rest eight subscales score less than 40, then balanced constitution was determined. If the subscale of Qi-deficiency constitution scores greater than or equal to 40, then Qi-deficiency was determined; and the likewise determination method was applied to Yang-deficiency, Yin-deficiency, Phlegm-dampness, Damp-heat, Stagnant Blood, Stagnant Qi, and Inherited Special Constitutions. If more than one subscale of unbalanced constitutions score

greater than or equal to 40, the largest one was chosen as main-type constitution. The reproducibility of CCMQ ranged from 0.76 to 0.90 for 9 sub-scales, Cronbach's α in each subscale was between 0.72 and 0.80, and the Balanced Constitution measured by CCMQ was positively corrected with SF-36 ($r = 0.58, p < 0.01$), while the unbalanced constitutions were negatively corrected with SF-36 ($r = 0.38–0.54, p < 0.01$).^{8–10}

The baseline information included the following: female demographic characteristics (i.e., age, family register, nationality, education, and per capita household income); physical condition (i.e., body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP), gum bleeding, history of disease (defined as “yes” for women with any of the following conditions in their medical histories: anemia, hypertension, diabetes mellitus, heart disease, thyroid disease, epilepsy, chronic nephritis, malignancy, tuberculosis, hepatitis B, genital system disease, and mental disorder), and history of pregnancy and childbearing (i.e., menstrual characteristics, dysmenorrhea, pregnancies, and history of adverse pregnant outcome)); diet and behavior (i.e., aversion to meat or eggs, aversion to vegetables, preference for raw meat, smoking, and drinking); and social psychological factors (i.e., job stress, economic stress, and interpersonal relationship stress). In the literature review, it was found that the prevalence of gum bleeding was high among the people whose age was similar to the sample in this study. So gum bleeding (i.e., in the past six months, gum bleeding happened at least once a month) was considered as an item in the physical condition. Additionally, the variables of social psychological factors were classified in three levels: no (i.e., no stress), moderate (i.e., women adapt to the stress quickly, and the stress did not influence their job or life), and heavy (i.e., women can not adapt to stress quickly, and the stress had influenced their job or life (e.g., having physical symptoms or psychological symptoms related to stress)).

2.3. Data analysis

All statistical analyses were performed using the Statistics Analysis System (SAS) for Windows, version 9.2. Chi-square tests and independent sample t-tests were used to explore the possible associated factors of Balanced Constitution. The variables that had significant differences that were less than or equal to 0.05 in the Chi-square test and t-test were used to build models of associated factors of Balanced Constitution in a logistic regression analysis. There were three models, including the association between Balanced Constitution and physical condition, dietary behavior, and social psychological factors. Because the significant differences of demographic characteristics (i.e., family register and nationality) were less than 0.05 in the Chi-square test, these two characteristics were used as adjusted variables in the logistic regression analysis. Then, to differentiate the contribution of three classes (i.e., physical condition, dietary behavior, and social psychological factors) on TCM constitution, variables with significant differences that were less than or equal to 0.05 in the three models of logistic regression analysis were used to build a

logistic regression model. Ultimately, a multinomial logistic regression analysis was used to explore the exact association between factors and special unbalanced constitutions.

3. Results

Seven-hundred-eight women participated in this study. Twenty-two (3.1%) women were aged 35 years and above, with ages ranging from 21.3 to 41.4, and a mean age of 28.3 ± 3.0 . Additionally, 87.3 percent of the women were college-educated and above, and 9.6 percent of the women completed upper secondary school.

No women had diabetes mellitus, chronic nephritis, epilepsy, malignancy, or mental disorders. Therefore, these variables were not included in the analysis of the associated factors of women's TCM constitutions.

3.1. The distribution of women's TCM constitution

Fifty-five percent of these women had Unbalanced constitutions. The distribution of nine types of TCM constitution was as follows: Balanced Constitution (320, 45.2%), Yang-deficiency Constitution (163, 23.0%), Yin-deficiency Constitution (67, 9.5%), Stagnant Qi Constitution (45, 6.4%), Phlegm-dampness Constitution (35, 4.9%), Stagnant Blood Constitution (25, 3.5%), Qi-deficiency Constitution (24, 3.4%), Inherited Special Constitution (15, 2.1%) and Damp-heat Constitution (14, 2.0%) (Fig. 1).

3.2. The analysis of factors associated with TCM constitution

It was found that Shanghai residence ($\chi^2 = 14.83$, $p = 0.00$), Han nationality ($p = 0.04$), gum bleeding ($\chi^2 = 16.63$, $p < 0.00$), dysmenorrhea ($\chi^2 = 8.23$, $p = 0.02$), aversion to vegetables ($\chi^2 = 4.77$, $p = 0.03$), preference for raw meat ($\chi^2 = 5.33$, $p = 0.02$), job stress ($\chi^2 = 52.53$, $p < 0.00$), economic stress ($\chi^2 = 34.95$, $p < 0.00$), and interpersonal relationship stress ($\chi^2 = 23.25$, $p < 0.00$) were adverse factors of Balanced Constitution according to the chi-square and t-tests (Table 1).

Based on the adjustment of family register and nationality, dysmenorrhea, and gum bleeding were negatively significantly

associated with Balanced Constitution in the logistic regression model of physical condition; preference for raw meat and aversion to vegetables were negatively significantly associated with Balanced Constitution in the logistic regression model of dietary behavior; job stress and economic stress were negatively significantly associated with Balanced Constitution in the logistic regression model of social psychological factors (Table 2).

The variables of dysmenorrhea and preference for raw meat were not significantly associated with Balanced Constitution in the total logistic regression analysis (Table 3).

In the multinomial logistic regression analysis, we found that Shanghai residence was significantly associated with Yang-deficiency and Stagnant Qi constitutions; gum bleeding was significantly associated with Yin-deficiency, Stagnant Blood, Stagnant Qi and Inherited Special constitutions; aversion to vegetables was significantly associated with Yang-deficiency and Damp-heat constitutions; job stress was significantly associated with Yang-deficiency, Phlegm-dampness, Damp-heat, Stagnant Blood and Stagnant Qi constitutions; economic stress was significantly associated with Yang-deficiency and Stagnant Qi constitutions (Table 4).

4. Discussion

In this study, 55% women who wanted to become pregnant had Unbalanced Constitution. Wang²¹ reported that in the Chinese general population, Unbalanced Constitution accounted for 67.86%. The difference may be caused by the younger sample in this study (28.3 ± 3.0 younger versus 41.57 ± 15.91). This study showed that Yang-deficiency, Yin-deficiency, Stagnant Qi, and Phlegm-dampness Constitutions were the most common four types of Unbalanced Constitution. Women with Unbalanced Constitution may have more discomfort symptoms and risks during a future pregnancy. Yang-deficiency, Yin-deficiency, and Phlegm-dampness were significantly associated with pregnancy discomfort.¹⁵ Meaghan et al.²² reported that 53.9% women who used assisted reproduction were diagnosed with kidney Yang-deficiency and that Qi or Blood stagnation was associated with poorer quality of mental health, emotional role function and social function domains of the SF36. The assessment of personality (nervous, shy/self-conscious, obsessed, angry or a worrier), psychiatric

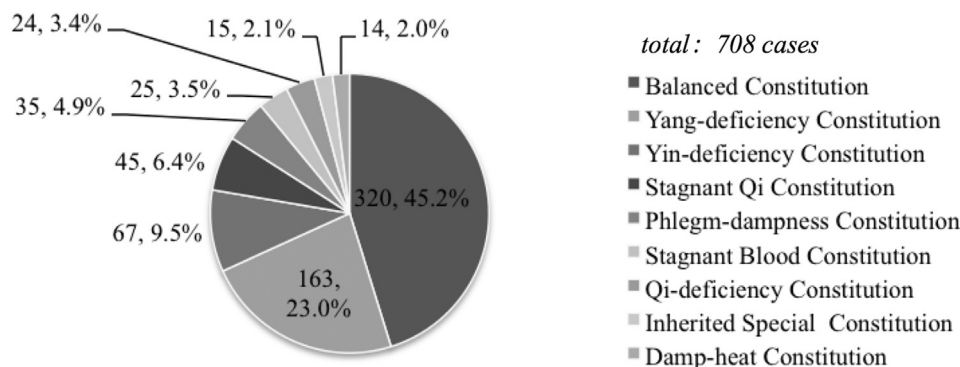


Fig. 1. The distribution of TCM constitution in women of childbearing age.

Table 1
The results of analysis of associated factors of Balanced Constitution.

Variables	Balanced Constitution		χ^2/t	p
	Yes (n = 320)	No (n = 388)		
Demographic characteristics				
Age (year), mean \pm SD	28.25 \pm 3.20	28.24 \pm 2.75	0.04	0.97
Capital income, n (%)			1.83	0.18 [#]
<1000	3 (1.0)	2 (0.5)		
1000–2000	4 (1.3)	5 (1.3)		
2000–3000	17 (5.4)	18 (4.7)		
3000–4000	50 (15.8)	49 (12.8)		
4000–5000	58 (18.4)	67 (17.5)		
>5000	184 (58.2)	241 (63.1)		
Shanghai residence (Yes), n (%)	214(67.1)	309(79.8)	14.83	0.00
Han nationality (Yes), n (%)	308(97.2)	9(2.8)		0.04[#]
Physical condition				
BMI (Kg/m ²), mean \pm SD	20.83 \pm 2.61	21.01 \pm 2.70	0.90	0.37
SBP (mmHg), mean \pm SD	109.5 \pm 10.33	108.0 \pm 11.07	1.84	0.07
DBP (mmHg), mean \pm SD	67.11 \pm 7.90	68.84 \pm 7.13	0.46	0.64
Gum bleeding (Yes), n (%)	75(23.5)	146(37.8)	16.63	<0.00
History of disease (Yes), n (%)	42 (13.2)	63 (16.2)	1.31	0.25
Anemia (Yes), n (%)	19 (5.9)	37 (9.5)	3.08	0.08
Hypertension (Yes), n (%)	0 (0.0)	1 (0.3)		1.00*
Heart disease (Yes), n (%)	1 (0.3)	6 (1.6)		0.09*
Thyroid disease (Yes), n (%)	17 (5.3)	15 (43.9)	0.87	0.35
Tuberculosis (Yes), n (%)	0 (0.0)	1 (0.3)		1.00*
Hepatitis B (Yes), n (%)	3 (0.9)	3 (0.8)		0.3*
Gynecological disease (Yes), n (%)	30 (9.4)	45 (11.6)	0.92	0.34
Irregular menstrual cycle (Yes), n (%)	26 (8.2)	46 (11.9)	2.63	0.11
Menstrual volume, n (%)			1.48	0.22 [#]
Much	23 (7.2)	32 (8.3)		
Moderate	273 (85.6)	309 (79.6)		
Little	23 (7.2)	47 (12.1)		
Dysmenorrhea, n (%)			5.29	0.02[#]
Heavy	15 (4.7)	40 (10.3)		
Mild	196 (61.4)	234 (60.3)		
Prior pregnancy (Yes), n (%)	72 (22.6)	85 (22.0)	0.05	0.83
History of stillbirth or abortion (Yes), n (%)	8 (2.6)	12 (3.3)	0.25	0.61
Diet and behavior				
Aversion to meat/egg (Yes), n (%)	4 (1.3)	3 (0.7)		0.24*
Aversion to vegetables (Yes), n (%)	7(2.2)	21(5.4)	4.77	0.03
Preferences for raw meat (Yes), n (%)	6(1.9)	20(5.2)	5.33	0.02
Smoking (Yes), n (%)	4 (1.3)	11 (2.8)	2.11	0.15
Drinking (Yes), n (%)	8 (2.5)	7 (1.8)	0.40	0.52
Psychological factors				
Job stress, n (%)			51.60	<0.00[#]
Heavy	7 (2.2)	52 (13.4)		
Moderate	216 (67.9)	286 (73.9)		
Economic stress, n (%)			34.69	<0.00[#]
Heavy	7 (2.2)	25 (6.5)		
Moderate	141 (44.3)	237 (61.2)		
Interpersonal relationship stress, n (%)			22.28	<0.00[#]
Moderate	68 (21.3)	146 (37.6)		
No	252 (78.7)	242 (62.4)		

Notes: *: p-value of Fisher's Exact Test; #: p-value of χ^2_{MHC} .

Corresponding variable and statistic with significant difference as bold.

history, recent life events, and sociodemographics would be beneficial for early identification of postnatal depression.²³ Easily gloomy and depressed, nervous, anxious, and sensitive were the outward manifestations of Stagnant Qi Constitution, so the screening of Stagnant Qi Constitution may be beneficial for the early identification of postnatal depression. The identification of constitution during preconception care would be helpful to understand the health status, be helpful to

provide more choices and personalized services for women, promote the health of mothers-to-be, and may reduce risks during pregnancy and childbearing.

Women whose family was registered in Shanghai were more like to have an Unbalanced Constitution, especially Yang-deficiency and Stagnant Qi. This finding may be related to the geographical and climatic characteristics of the Shanghai region and the more fast-paced and pressured

Table 2

The three logistic regression models of associated factors of Unbalanced Constitution compared to Balanced Constitution.

Variables	β	SE	Wald	<i>p</i>	OR	95%CI
Model 1						
Shanghai residence	0.56	0.18	9.68	0.002	1.74	(1.23, 2.48)
Han nationality	1.03	0.68	2.28	0.131	2.80	(0.74, 10.66)
Dysmenorrhea	0.27	0.14	3.98	0.046	1.31	(1.01, 1.71)
Gum bleeding	0.61	0.17	12.37	0.000	1.83	(1.31, 2.57)
Model 2						
Shanghai residence	0.60	0.18	11.52	0.001	1.83	(1.29, 2.58)
Han nationality	1.22	0.69	3.07	0.080	3.38	(0.87, 13.19)
Aversion to vegetables	0.89	0.45	3.87	0.049	2.44	(1.00, 5.94)
Preference for raw meat	0.98	0.48	4.16	0.041	2.68	(1.04, 6.89)
Model 3						
Shanghai residence	0.64	0.19	12.11	0.001	1.91	(1.33, 2.74)
Han nationality	0.60	0.70	0.73	0.393	1.83	(0.46, 7.27)
Job stress	0.80	0.19	17.62	0.000	2.22	(1.53, 3.21)
Economic stress	0.38	0.18	4.75	0.030	1.47	(1.04, 2.08)
Interpersonal relationship stress	0.33	0.20	2.75	0.100	1.39	(0.94, 2.05)

The reference group is Balanced Constitution (n = 320); SE = standard error; OR = odds ratio; CI = confidence interval.

Model 1: logistic model of physical condition and Balanced Constitution, adjusted for Shanghai residence and Han nationality.

Model 2: logistic model of dietary behavior and Balanced Constitution, adjusted for Shanghai residence and Han nationality.

Model 3: logistic model of psychological factors and Balanced Constitution, adjusted for Shanghai residence and Han nationality.

Corresponding variable and statistic with significant difference as bold.

lifestyles in Shanghai. For example, people always stay indoors with air conditioning during hot seasons, and the lack of outdoor exercise would easily damage Yang-Qi.

Gum bleeding might indicate the existence of some Unbalanced Constitutions (e.g., Yin-deficiency, Stagnant Blood, Stagnant Qi, and Inherited Special). However, dysmenorrhea was not significantly associated with TCM constitution in the total variables' logistic regression analysis. Gum bleeding may be caused by gum disease (e.g., gingivitis and periodontitis) that was associated with oral health behavior,²⁴ and is also a symptom of or related to other disease (e.g., leukemia, asthma, self-reported COPD, and chronic kidney disease).^{25,26} Gum bleeding can be caused by blood overflowing from peripheral vessel. From the perspective of TCM, gum bleeding has various pathological mechanisms. It may be caused by excess heat, resulting from Yin-deficiency, which can exhaust an individual's essences and blood and could be harmful to

Table 3

The total logistic regression model of the associated factors of Unbalanced Constitution compared to Balanced Constitution.

Variables	β	SE	Wald	<i>p</i>	OR	95%CI
Shanghai residence	0.55	0.19	8.57	0.003	1.73	(1.20, 2.49)
Dysmenorrhea	0.17	0.14	1.44	0.299	1.19	(0.90, 1.57)
Gum bleeding	0.54	0.18	8.93	0.003	1.71	(1.20, 2.43)
Aversion to vegetables	1.12	0.49	5.19	0.023	3.05	(1.17, 7.97)
Preference for raw meat	0.51	0.49	1.08	0.299	1.67	(0.64, 4.39)
Job stress	0.82	0.19	18.58	0.000	2.28	(1.57, 3.31)
Economic stress	0.44	0.17	6.98	0.008	1.56	(1.12, 2.16)

The reference group is Balanced Constitution (n = 320); SE=standard error; OR=odds ratio; CI=confidence interval.

Corresponding variable and statistic with significant difference as bold.

Balanced Constitution. In TCM, the spleen is responsible for keeping blood within the vessels. Excess anxiety accompanied by Stagnant Qi may impair spleen and cause deficiency of spleen-Qi contributing to gum bleeding. Moreover, Stagnant Blood may come from accumulation of cold, Qi deficiency, and stagnant Qi. With this constitution, the blood may coils through vessels and overflow from peripheral vessels (e.g., gum bleeding). From the points of TCM, sensitiveness may be caused by weakness of defensive Qi (e.g., spleen-Qi, kidney-Qi). All the above were consistent with the result that gums bleeding has a high proportion in unbalanced constitution. Additionally, Qi and blood are directly related to menstruation. Weak Qi may block the flow of blood and cause dysmenorrhea. However, in this cross-sectional study, the causal relationship between TCM constitution and gum bleeding/dysmenorrhea can not be determined. But this study implied that attention should be given to women with gum bleeding and dysmenorrhea in a timely manner, to avert the adverse effects. Personalized treatment based on TCM constitution would be helpful for improving gum bleeding and dysmenorrhea.

Dietary behavior was associated with TCM constitution. Aversion to vegetables was associated with Unbalanced Constitutions, especially Damp-heat Constitution. From the TCM perspective, a key elements of maintaining Balanced Constitution is comprehensive, balanced, and moderate dietary intake. Mineral substances, vitamins, and dietary fiber contained in vegetables are necessary for nutrient balance. Additionally, dietary fiber can regulate glycolipid metabolism and is beneficial to digestive function. TCM states that the spleen and stomach, parts of the digestive system, are the fundamental factors of acquired constitution and the source of Qi, where blood is generated. Sufficient and balanced Qi and blood are helpful for women's menstruation, pregnancy, delivery, and breastfeeding. Moreover, functional digestion is helpful for the excretion of Damp-heat. Thus, vegetable intake is good for Balanced Constitution by regulating digestive function. Additionally, various vegetables/foods have different features according to the theory of TCM. For example, yams, sweet potatoes and potatoes, which reinforce the spleen and strengthen Qi, are good for the Qi-deficiency constitution. Therefore, women should choose various types of vegetables/foods according to various constitutions. As we know, raw meat is not digestible and easily carries microbes, so we tend to eat cooked food. Additionally, it was found that preference for raw meat was significantly and positively associated with Yin-deficiency and Inherited Special Constitution only in the logistic regression model of diet behavior. Only 20 participants had this behavior in this study, so the relationship between this behavior and TCM constitution should be demonstrated in a study with a larger sample.

Stress was significantly and negatively associated with Balanced Constitution. This finding was similar to Wang's findings,¹⁵ which revealed that stress levels were significantly and positively correlated with the constitutions of Yang-deficiency, Yin-deficiency, and Phlegm-dampness and that, higher stress levels were associated with greater tendencies of

Table 4
Results of multinomial regression analysis comparing Unbalanced Constitution groups to Balanced Constitution group.

Factors	Qi-deficiency (n = 24)		Yang-deficiency (n = 163)		Yin-deficiency (n = 67)		Phlegm-dampness (n = 35)		Damp-heat (n = 14)		Stagnant Blood (n = 25)		Stagnant Qi (n = 45)		Inherited Special (n = 15)	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Shanghai residence	5.90	0.75–46.10	2.36	1.00–5.60	2.94	0.85–10.23	5.73	0.73–44.87	1.25	0.55–2.84	1.39	0.74–2.58	1.62	1.03–2.56	1.57	0.56–4.43
Gum bleeding	2.68	0.90–7.96	1.26	0.62–2.56	4.22	1.80–9.92	1.04	0.31–3.47	0.84	0.36–1.97	1.75	1.00–3.10	1.63	1.07–2.50	4.02	1.70–9.53
Aversion to vegetables	<0.001		4.50	1.02–19.80	1.96	0.88–26.88	<0.001		8.01	2.03–31.60	2.55	0.61–10.74	2.91	0.96–8.79	2.62	0.29–23.68
Job stress	1.32	0.36–4.78	3.85	1.78–8.37	1.67	0.66–4.48	6.13	1.88–20.01	3.53	1.50–8.29	2.51	1.36–4.65	1.90	1.20–3.02	1.96	0.72–5.31
Economic stress	2.30	0.75–7.04	2.27	1.18–4.37	1.96	0.83–4.63	0.70	0.25–1.93	1.75	0.85–3.57	1.08	0.63–1.86	1.65	1.10–2.47	1.97	0.82–4.72

The reference group is Balanced Constitution (n = 320); OR = odds ratio; CI = confidence interval.

Corresponding variable and statistic with significant difference as bold.

these three Unbalanced constitutions. In this study, the results showed that job stress was significantly and positively associated with Yang-deficiency, Phlegm-dampness, Damp-heat, Stagnant Blood, and Stagnant Qi Constitutions and that economic stress was significantly and positively associated with Yang-deficiency and Stagnant Qi Constitutions. Interpersonal relationship was not associated with TCM constitution in the logistic regression analysis. This finding may be caused by the fact that the number of women with heavy stress in an interpersonal relationship was zero. Women with stress may feel anxious and may not have a peaceful mood. Emotional disorders can damage Yang-Qi and cause Yang-Qi deficiency,¹² and excessive emotional activities can also change into heat, which exhausts Yin-Blood and causes Yin-deficiency.¹³ Disharmonious mood and essence-spirit would cause Yin-Yang disharmony, disturbance of Qi and blood, dysfunction of Zang-organs, and dysfunction of Fu-organs and would influence the individual TCM constitution.²⁷ Additionally, it was reported that women with psychosocial stress have a higher utilization of health services (obstetrics/gynaecology visits, general health counseling, and pregnancy planning counseling).²⁸ Therefore, if decompressing skills and dietary/life adjustment based on TCM constitution can be integrated into modern female health care, the health of women with stress would improve.

This study presented the following limitation. First, this study is a cross-sectional study that was weak in its argument of cause-and-effect. The connection between variables (i.e., Shanghai residence, aversion to vegetables, preference for raw meat, gum bleeding, dysmenorrhea, job stress, and economic stress) and the TCM constitution should be demonstrated by a prospective cohort study. Second, the odds ratio (OR) of some of the variables could not be exactly estimated because of the small sample size in the sub-classification during the multinomial logistic analysis. This factor may reduce statistical power. Third, few participants of this study had medical conditions, so the relationship between medical conditions and the TCM constitution could not be estimated.

In conclusion, this study revealed that more than half of the participating women had Unbalanced Constitution, which is disadvantageous to health of maternal and foetal/new-born health. Shanghai residence, dysmenorrhea, gum bleeding,

aversion to vegetables preference for raw meat, job stress, and economic stress were significantly associated with various unbalanced constitutions. These factors may be considered to be warning indications of Unbalanced Constitutions. These results imply that women might have potential TCM constitution risks even if they do not have medical conditions. Applying the theory of TCM constitution to preconception care is beneficial for personalized health care services (e.g., understanding female constitution, health education, and dietary education) and developing Balanced Constitution. This strategy may be more acceptable and effective.

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