

The Association Between Traditional Chinese Medicine Constitution and Polycystic Ovary Syndrome: A Systematic Review and Meta-Analysis

Si Woei Goh^{1,2}, Kim Sia Sng^{3,4}, Ze Wei Kwek⁵, Weng Quen Loo⁶, Wei Shi^{7*}

¹Department of Chinese Medicine, School of Alternative and Complementary Medicine, IMU University, Kuala Lumpur, Malaysia, 57000.

²International Education College, Shandong University of Traditional Chinese Medicine, Shandong, China, 250355.

ORCID iD: <https://orcid.org/0009-0006-8427-4632>, Email: gohsiwoei@imu.edu.my

³Department of Chinese Medicine, School of Alternative and Complementary Medicine, IMU University, Kuala Lumpur, Malaysia, 57000.

⁴International Education College, Heilongjiang University of Chinese Medicine, Heilongjiang, China, 150001.

ORCID iD: <https://orcid.org/0000-0002-9137-9655>, Email: kimsiasng@imu.edu.my

⁵Department of Chinese Medicine, School of Alternative and Complementary Medicine, IMU University, Kuala Lumpur, Malaysia, 57000.

ORCID iD: <https://orcid.org/0009-0008-3199-4534>, Email: zeweikwek@gmail.com

⁶Department of Chinese Medicine, School of Alternative and Complementary Medicine, IMU University, Kuala Lumpur, Malaysia, 57000.

ORCID iD: <https://orcid.org/0009-0008-4875-9346>, Email: stuartyouknow988@gmail.com

⁷Department of Gynecology, The Affiliated Hospital of Shandong University of Traditional Chinese Medicine, Shandong, China, 250014.

ORCID iD: <https://orcid.org/0000-0001-9231-6245>, Email: sw19781214@163.com

Abstract

Background: Traditional Chinese Medicine (TCM) emphasises preventive care, with TCM constitution as the foundation of this methodology. Consequently, identifying the TCM constitution is essential for forecasting disease prognosis or prevention. This systematic review aims to examine the relationship between TCM constitution and polycystic ovarian syndrome (PCOS). **Methodology:** The databases China National Knowledge Infrastructure, Wanfang, Chongqing VIP, SinoMed, PubMed, Web of Science, Cochrane Library, and EMBASE were examined from April 2009 to October 2024. The search phrases encompassed “polycystic ovary syndrome,” “Chinese medicine,” and “body constitution.” Cohort, case-control, and cross-sectional studies regarding the TCM constitution of patients with PCOS were included. The Agency for Healthcare Research and Quality standards were employed to evaluate cross-sectional studies, whilst the Newcastle-Ottawa Scale was utilised to assess the quality of case-control and cohort studies. The meta-analysis was conducted using STATA 18.0 software. The effect size was expressed as a proportion and log odds ratio (OR) with a 95% confidence interval (CI). A two-tailed P-value below 0.05 is deemed statistically significant. **Results:** Twenty-one cross-sectional studies and four case-control studies including 8,740 PCOS individuals were considered. The findings indicated that the prevalence of Phlegm Dampness and Damp Heat constitution is 2.76 times and 2.14 times greater than that of the healthy participants, respectively. The Balanced constitution may serve as a preventive factor against PCOS, presenting a risk just 0.13 times greater than that of healthy participants. The predominant TCM constitutions in PCOS patients are Phlegm-Dampness (18%), Qi Deficiency (16%), and Blood Stasis (12%). **Conclusion:** The research indicates that Phlegm Dampness and Damp Heat may act as possible risk factors for patients with PCOS, whilst a Balanced constitution may have a protective effect. The results indicate that the predominant Traditional Chinese Medicine constitutions in patients with PCOS are Phlegm Dampness, Qi Deficiency, and Blood Stasis.

Keywords: Traditional Chinese Medicine Constitution, Polycystic Ovary Syndrome, PCOS, Systematic Review, Meta-Analysis.

INTRODUCTION

The World Health Organisation (WHO) states that polycystic ovarian syndrome (PCOS) is the most prevalent endocrine condition, impacting around 8 to 13% of women of reproductive age worldwide. According to the Standard Knowledge Library of TCM Science Popularisation, 6.05% of the Chinese female population is affected by this ailment, which accounts for around 13.69% of infertility cases. It also impacts the

health-related quality of life of women, with a noted rise in the prevalence of depression, anxiety symptoms, and other

Address for Correspondence: Department of Gynecology, The Affiliated Hospital of Shandong University of Traditional Chinese Medicine, Shandong, China, 250014
Email: sw19781214@163.com

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significant mental diseases.^[1,2] The diagnostic criteria for PCOS align with the 2003 Rotterdam Criteria, which encompass symptoms of oligo-anovulation, hyperandrogenism, and the physical appearance of polycystic ovaries on ultrasonography; a definitive diagnosis is established when two of the three signs are present. Clinically, it presents as irregular menstruation, infertility, acne or seborrhoeic skin, alopecia, abundant body hair, and weight gain, particularly in the abdomen region.^[3-5] The precise aetiology of PCOS remains ambiguous due to its intricate pathophysiological mechanisms. A plethora of research^[1,6-8] indicates that PCOS may be associated with hyperandrogenism, insulin resistance, genetic predispositions, and adverse emotional states. Western Medicine's therapeutic strategies mostly involve symptomatic treatments such as oral contraceptive pills, metformin, hormones, and laser therapy to alleviate various symptoms of PCOS.^[8-10] Lifestyle adjustments seem to be the crucial pathway to holistic and sustainable treatment of PCOS.^[3,8,11]

For millennia, Traditional Chinese Medicine (TCM) has emphasised preventive treatment, specifically identifying diseases prior to their beginning or avoiding their development. The foundation of this methodology is TCM constitution. The Classification and Determination of TCM constitution, assessed via the Constitution in Chinese Medicine Questionnaire (CCMQ), was officially released in April 2009 and endorsed by the China Association of Chinese Medicine (CACM) as the standard guideline for classifying the nine TCM constitutions. It seeks to establish a basis for recognising TCM constitutions, comprehending disease origin, development, and prognosis, while also facilitating health preservation and preventive disease management. The nine classifications of Traditional Chinese Medicine constitutions are Balanced, Yin Deficiency, Yang Deficiency, Qi Deficiency, Qi Stagnation, Damp Heat, Phlegm Dampness, Blood Stasis, and Inherited Special constitutions. A balanced constitution is deemed healthy, while the remaining eight are classified as biased constitutions.^[12] Each TCM constitution type signifies the overarching physiological and pathological inclinations of an individual, which may influence their reactions to external and internal stimuli. Certain researchers have introduced the "Constitution-Disease Correlation Theory," positing that each TCM constitution is predisposed to and has a greater propensity for various signs and symptoms.^[12-14] The correlation between TCM constitution and PCOS may facilitate prognosis prediction or assist in preventive to mitigate disease beginning risk.

A number of clinical investigations have shown the link between PCOS and TCM constitution, providing significant clinical evidence for examining the distribution of TCM constitution in patients with PCOS.^[15-18] Nevertheless, no current systematic review or meta-analysis has been performed. Consequently, a thorough assessment is essential to produce a solid, evidence-based summary that offers more substantial and higher-level information derived from bigger sample sizes.

METHOD

Registration and Study Design

The methodology for this systematic review and meta-analysis

was registered with the International Prospective Register of Systematic Reviews (PROSPERO) under registration number CRD420251009883, available at <https://www.crd.york.ac.uk/PROSPERO/view/CRD420251009883>. This systematic review and meta-analysis was performed in accordance with the 2020 extension standards of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).^[19]

Source of Information and Search Strategy

A thorough literature search was performed across Chinese and English databases, including China National Knowledge Infrastructure (CNKI), Wanfang, Chongqing VIP, SinoMed, PubMed, Web of Science, Cochrane Library, and EMBASE. The search encompassed studies published from April 2009 to October 2024. Publications dated before April 2009 were eliminated, aligning with the official announcement by the CACM concerning the TCM constitution. No restrictions on language or publishing were imposed. The search terms were "polycystic ovary syndrome," "Chinese medicine," and "body constitution." The comprehensive search methodologies are outlined in the Supplementary Data.

Inclusion Criteria

1. Only cross-sectional, case-control, or cohort studies investigating the TCM constitution of PCOS patients were considered.
2. Subjects in case groups must be diagnosed as PCOS with reference to Rotterdam criteria 2003.^[4] The control group should be healthy individuals drawn from the general population.
3. TCM constitution should follow the Classification and Determination of TCM Constitution, measured by the CCMQ recommended by the CACM.^[12]
4. The studies must present the prevalence of different types of TCM constitution among patients with PCOS.

Exclusion Criteria

1. Publications originating from the same population source and containing duplicate data.
2. Review articles, academic theses, symposium papers, clinical trials, clinical reports, and animal studies.
3. Studies lacking a clear methodology, detailed sample source information, or clearly defined eligible criteria.
4. Studies focusing exclusively on a single TCM constitution type, such as those limited to Yang deficiency constitution.

Data Screening and Quality Assessment

The procedure was conducted autonomously by two investigators, with any discrepancies addressed through consultation with a third seasoned investigator. Data extraction was conducted via Microsoft Excel. Initially, redundant publications were eliminated. Subsequently, the title and abstract were evaluated, followed by an examination of the full-text articles. Ultimately, qualifying papers were selected for data extraction. The extracted data comprised authors, publication year, study area, duration, design, sample size, age, and stated TCM constitution kinds. The American Agency for Healthcare Research and Quality (AHRQ) was

employed to evaluate cross-sectional investigations, whereas the Newcastle Ottawa Scale (NOS) was utilised to assess the quality of case-control and cohort studies.^[20,21] The AHRQ comprises 11 rating criteria, categorising research as high quality with scores of 8 to 11 points, moderate quality with scores of 4 to 7, and low quality with scores ranging from 0 to 3.^[20] The NOS comprises eight variables across three categories, with study quality classified as good, fair, or poor according to established levels.^[21]

Data Analysis

The examination of TCM constitution was performed utilising STATA version 18.0. Effect sizes were reported as log odds ratios (OR), along with their 95% confidence intervals (CI). A P-value under 0.05 (two-tailed) was designated as the criterion for statistical significance. The heterogeneity among studies was assessed using the inconsistency index (*I*) analysis. When heterogeneity was considered modest ($P \leq 0.05$ and $I < 50\%$), a fixed effect model was utilised. If the heterogeneity was considered high ($P < 0.05$ or $I \geq 50\%$), a random-effects model was utilised. Forest plots were utilised to visually depict the descriptive statistics.

The robustness of findings was examined by a sensitivity analysis employing the leave-one-out method to identify influential studies affecting effect sizes. Subgroup analyses were conducted where relevant. Funnel plots were utilised to evaluate potential publication bias.

RESULTS

Study Characteristic

A cumulative number of 1155 studies was identified across the eight databases. After the removal of duplicate data, titles and abstracts were evaluated, resulting in 41 articles deemed potentially relevant, which were then subjected to full-text assessment. Sixteen studies were removed for failing to report or adhere to the Rotterdam Criteria 2003,^[4] selectively reporting TCM constitutions, not following CCMQ,^[12] and not meeting the inclusion criteria, respectively. This review ultimately comprised twenty-five research, consisting of 21 cross-sectional studies and 4 case-control studies. The study selection process and the rationale for exclusions are illustrated in Figure 1. Table 1 delineates the characteristics of the included studies and their corresponding assessment scores.

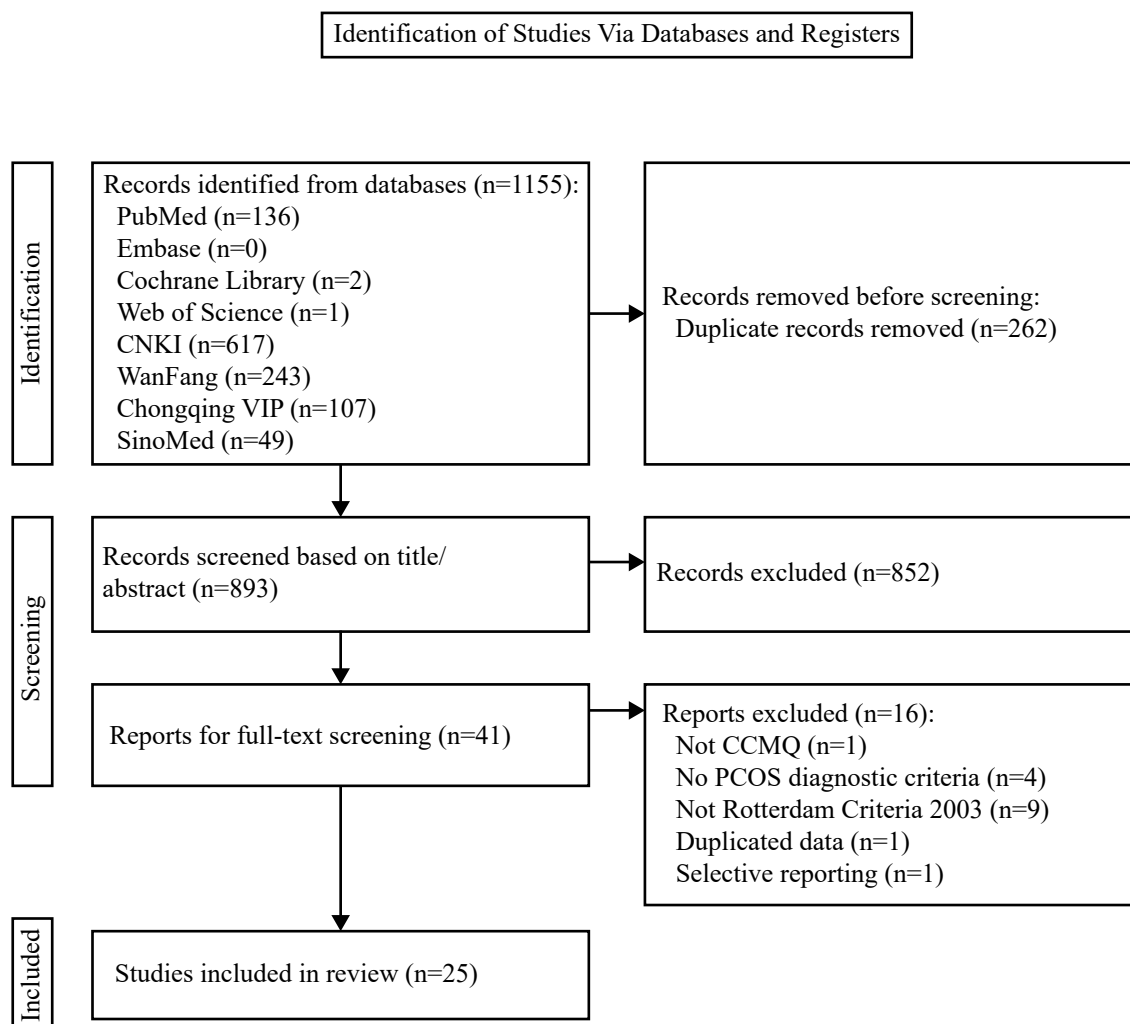


Figure 1: PRISMA Flowchart.

Table 1: The Characteristics and Quality Assessment Score of Included Studies.

Study ID	Study Area	Study Region	Study Type	Case Group Source	Control Group Source	Case/Control Patient Number	Age Range	Quality Assessment Score	Multiple Constitution Reported
Guo L 2015 ^[22]	Chengdu, Sichuan	S	CCS	Hospital Outpatient	Hospital Health Screening	20/20	Case: 24-37, Control: 21-38	6	Yes
Pan ZL 2016 ^[23]	Nanchang, Jiangxi	S	CCS	Hospital Outpatient	Hospital Health Screening	100/100	Case: 15-32, Control: 18-34	6	No
Yang JW 2012 ^[24]	Guangzhou, Guangdong	S	CCS	Hospital Outpatient	-	70/35	Case: 18-35, Control: 19-30	4	Yes
Zhu HQ 2017 ^[25]	Chengdu, Sichuan	S	CCS	Hospital Outpatient	Community	143/60	-	6	No
Ding CL 2016 ^[26]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	390	16-40	4	Yes
Feng YH 2023 ^[27]	Ningxia	N	CSS	Hospital Outpatient	-	104	<20	5	No
Gao JJ 2017 ^[28]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	263	18-40	5	No
Li RL 2013 ^[29]	Zhengzhou, Henan	N	CSS	Hospital Outpatient	-	980	18-40	4	No
Li W 2020 ^[30]	Qingdao, Shandong	N	CSS	Hospital Outpatient	-	268	25-39	5	Yes
Li XF 2016 ^[31]	Nanchang, Jiangxi	S	CSS	Hospital Outpatient	-	120	14-22	2	No
Liu JJ 2017 ^[32]	Jinan, Shandong	N	CSS	Hospital Outpatient	-	110	18-38	5	No
Liu JJ 2019 ^[33]	Jinan, Shandong	N	CSS	Hospital Outpatient	-	266	18-38	4	No
Liu YH 2017 ^[34]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	460	-	4	No
Liu ZY 2021 ^[35]	Guiyang, Guizhou	S	CSS	Hospital Outpatient	-	113	21-35	4	No
Mao X 2020 ^[36]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	333	15-40	5	No
Peng CL 2016 ^[38]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	300	-	5	No
Wang AJ 2024 ^[37]	Weifang, Shandong	N	CSS	Hospital Outpatient	-	312	18-40	5	No
Wu SN 2018 ^[38]	Guangzhou, Guangdong	S	CSS	Hospital Outpatient	-	60	23-36	5	No
Yang YT 2020a ^[39]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	483	-	3	Yes
Yang YT 2020b ^[40]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	212	10-19	4	Yes
Ying JM 2022 ^[41]	Liuzhou, Guangxi	S	CSS	Hospital Outpatient	-	120	18-39	5	No
Zhang Q 2017 ^[42]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	462	19-40	5	No
Zhang W 2022 ^[43]	Yangjiang, Guangdong	S	CSS	Hospital Outpatient	-	60	20-45	5	No
Zhang YC 2023 ^[44]	Ningxia	N	CSS	Hospital Outpatient	-	200	-	5	No
Zhu CY 2019 ^[45]	Harbin, Heilongjiang	N	CSS	Hospital Outpatient	-	423	-	5	No

Notes.

N: North; S: South; CSS: cross-sectional study; CCS: case-control study;

Quality Assessment

The NOS scores of four case-control studies^[22-25] ranged from 4 to 6 due to issues in the identification of controls and the control of confounding variables. No research disclosed details concerning the non-response rate. Nineteen cross-sectional studies^[18,26-30,32-38,40-45] were assessed as medium quality, whereas two studies^[31,39] were deemed low quality. None of the studies indicated blinding, conducted quality assurance reviews, or managed missing data appropriately. The AHRQ scale ranged from 2 to 5.

TCM Constitution Distribution Among PCOS Patients and Non-PCOS Participants
Balanced Constitution

Four investigations^[22-25] comprised a total of 333 patients with PCOS, of which 39 patients had a Balanced constitution. Of the 215 non-PCOS participants, 97 indicated a Balanced constitution. A random-effects model was utilised due to significant heterogeneity among trials ($I^2 = 72.78$, $P = 0.01$). According to Figure 2, the meta-analysis produced an odds ratio of 0.13 [95% CI: (0.05, 0.34)], indicating a statistically significant difference ($P < 0.0001$).

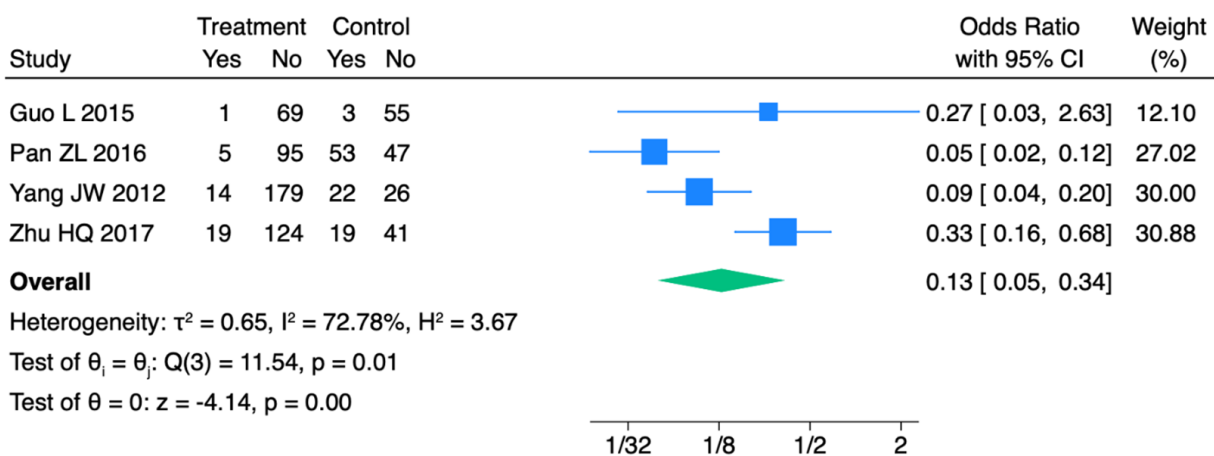


Figure 2: Meta-analysis of Balanced Constitution Distribution in PCOS Patient and Non-PCOS Participants.

Phlegm Dampness Constitution

Four investigations^[22-25] comprised a total of 333 patients with PCOS, of whom 81 exhibited Phlegm Dampness

constitution. Of the 215 non-PCOS individuals, 18 indicated a Phlegm Dampness constitution. Owing to the absence of heterogeneity across the included studies

($I^2 = 0$, $P = 0.51$), a fixed-effect model was utilised. As indicated in Figure 3, the meta-analysis produced an

odds ratio of 2.76 [95% CI: (1.58, 4.80)], signifying a statistically significant difference ($P < 0.0001$).

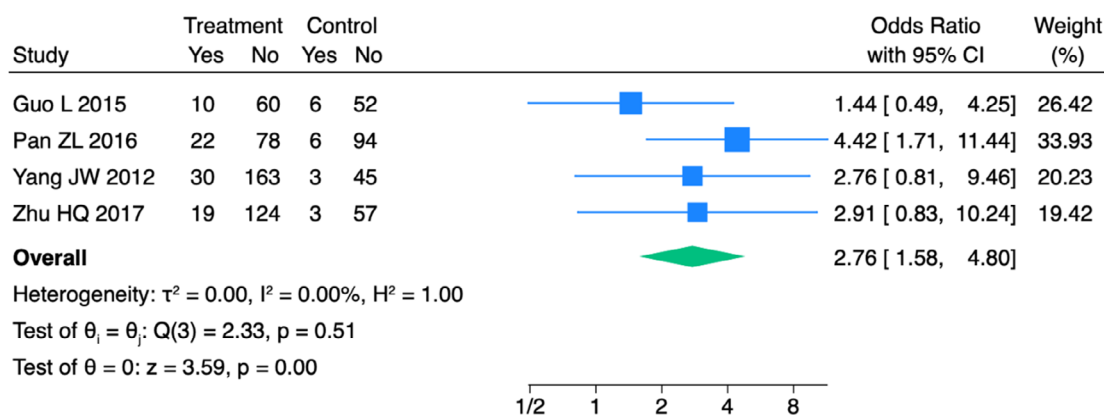


Figure 3: Meta-analysis Phlegm Dampness Constitution Distribution in PCOS patient and Non-PCOS Participants.

Damp Heat Constitution

Four investigations^[22-25] comprised a total of 333 PCOS patients, among whom 100 exhibited Damp Heat constitution. Of the 215 non-PCOS participants, 28 indicated a Damp Heat constitution. In the absence of

heterogeneity across the included studies ($I^2 = 36.69$, $P = 0.19$), a fixed-effect model was utilised. According to Figure 4, the meta-analysis produced an odds ratio of 2.14 [95% CI: (1.14, 3.67)], indicating a statistically significant difference ($P = 0.02$).

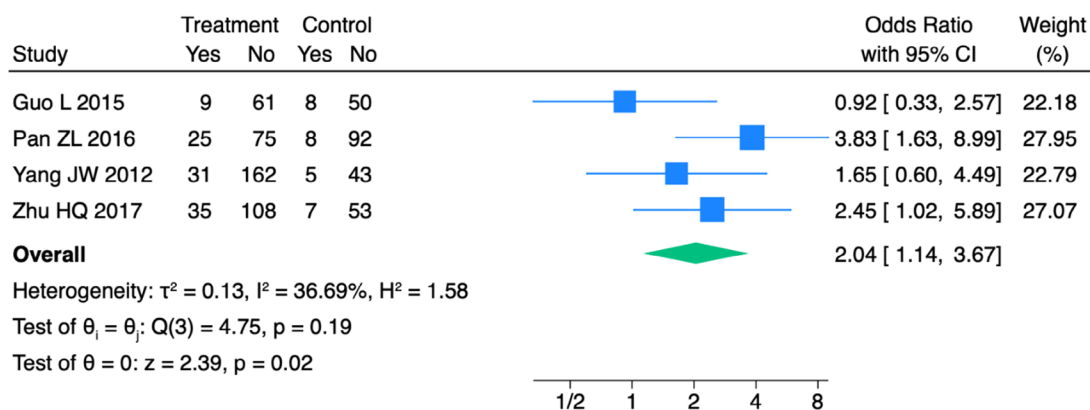


Figure 4: Meta-analysis of Damp Heat Constitution Distribution in PCOS Patient and Non-PCOS Participants.

Other TCM Constitutions

The review reported the other TCM constitutions

distribution, which are listed in Table 2 according to their OR from highest to lowest.

Table 2: Other TCM Constitutions in PCOS Patient and Non-PCOS Participants.

TCM Constitution	Total PCOS Patient Number	Total Case Number	Total non-PCOS Participant Number	Total Control Number	OR	95% CI	I^2 (%)	P
Blood Stasis	333	40	215	15	1.88	0.97~3.64	4.18	0.06
Qi Stagnation	333	82	215	25	1.75	0.84~3.66	50.78	0.14
Inherited Special	333	13	215	5	1.50	0.53~4.29	0	0.45
Yin Deficiency	333	47	215	18	1.28	0.69~2.35	0	0.43
Qi Deficiency	333	49	215	27	0.91	0.53~1.56	0	0.74
Yang Deficiency	333	55	215	33	0.75	0.46~1.23	0	0.25

TCM Constitution Distribution Among PCOS patients Phlegm Dampness Constitution

Twenty-one investigations^[18,26-45] involving a total of 1246 individuals documented the prevalence of Phlegm Dampness constitution. A random-effects model was

utilised due to significant heterogeneity among trials ($I^2 = 97.89$, $P < 0.0001$). According to Figure 5, the analysis indicated that 18% [95% CI: (0.13, 0.22)] of PCOS patients had Phlegm Dampness constitution, showing a statistically significant difference ($P < 0.0001$).

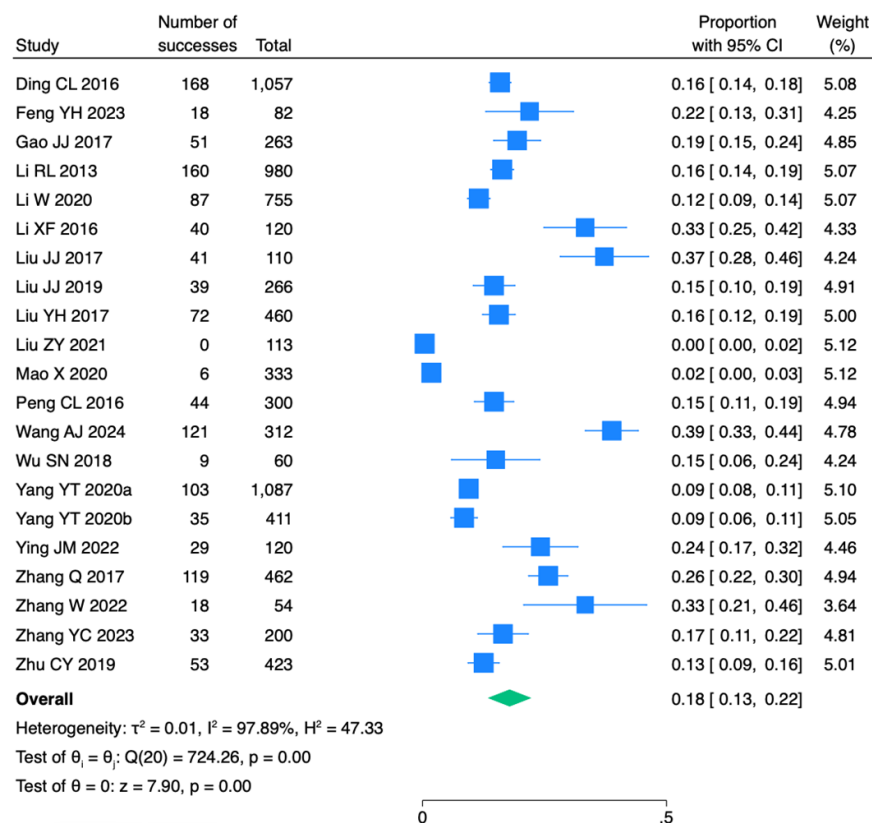


Figure 5: Meta-analysis of Phlegm Dampness Constitution Distribution in PCOS Patients.

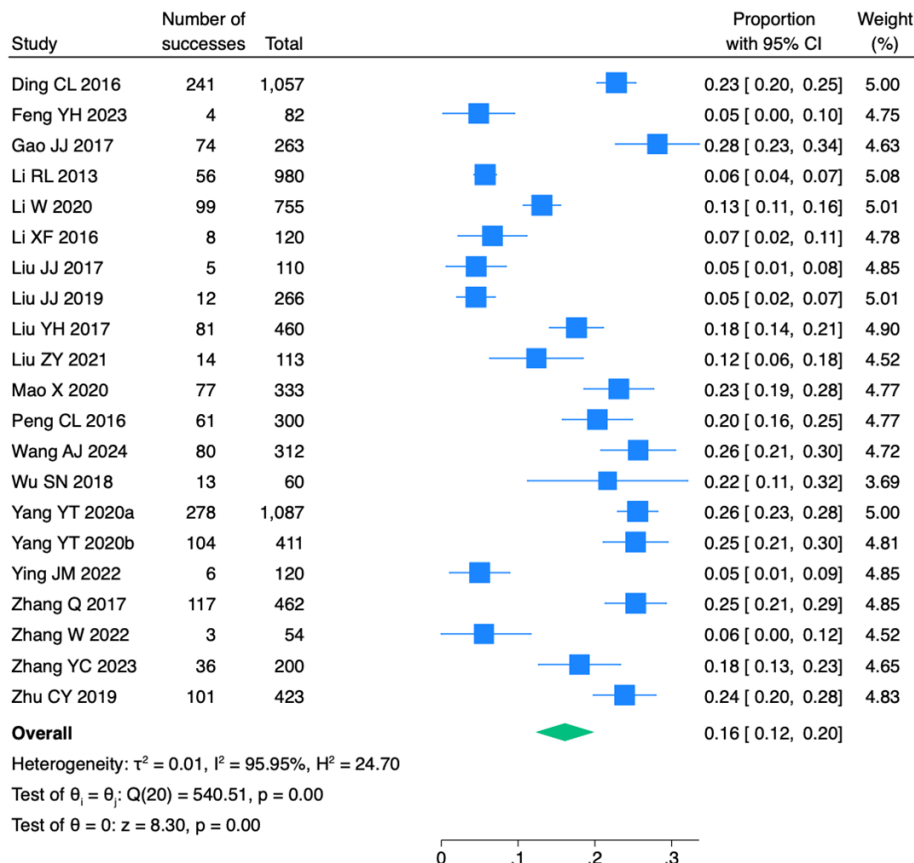


Figure 6: Meta-analysis of Qi Deficiency Constitution Distribution in PCOS Patients.

Qi Deficiency Constitution

Twenty-one studies^[18,26-45] encompassing 1470 individuals documented the prevalence of Qi Deficiency constitution. A random-effects model was utilised due to significant heterogeneity among trials ($I^2 = 95.95$, $P < 0.0001$). According to Figure 6, the study indicated that 16% [95% CI: (0.12, 0.20)] of PCOS patients exhibited a Qi Deficiency constitution, showing a statistically significant difference ($P < 0.0001$).

Blood Stasis Constitution

Twenty investigations^[18,26-45] involving a total of 1183 individuals documented the prevalence of Blood Stasis constitution. A random-effects model was utilised due to significant heterogeneity among trials ($I^2 = 97.41$, $P < 0.0001$). According to Figure 7, the analysis indicated that 12% (95% CI: (0.09, 0.16)) of PCOS patients exhibited Blood Stasis constitution, showing a statistically significant difference ($P < 0.0001$).

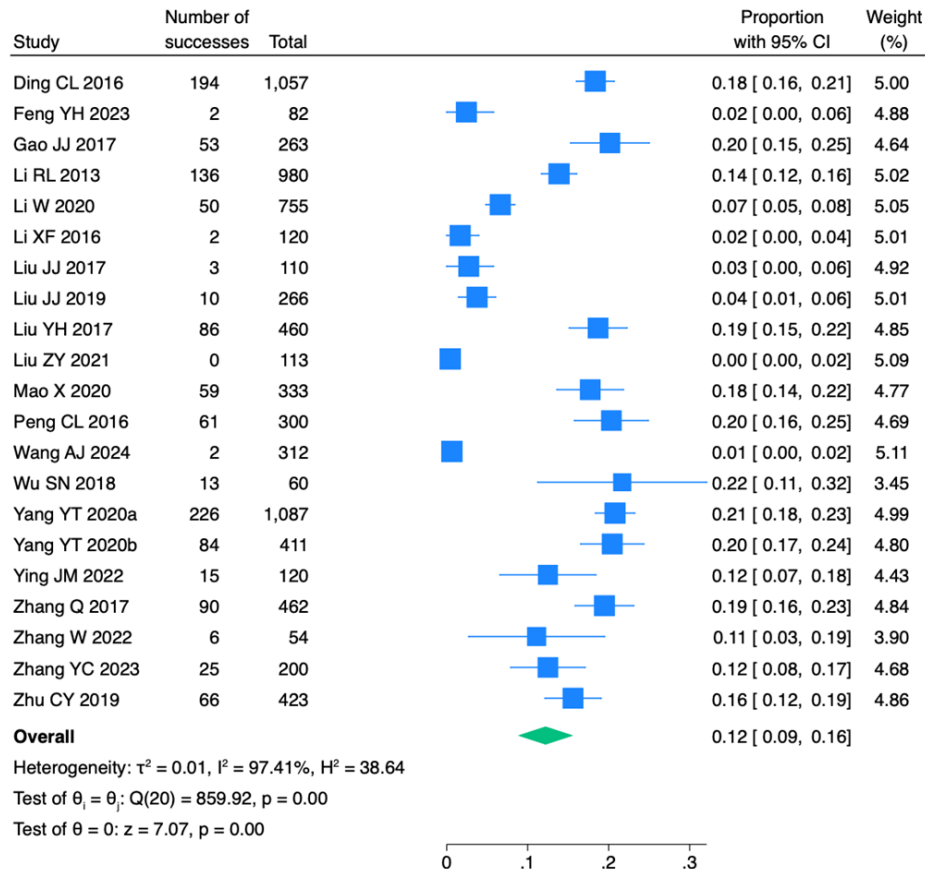


Figure 7: Meta-analysis of Blood Stasis Constitution Distribution in PCOS Patients.

Other TCM Constitutions

The occurrence of additional TCM constitutions in PCOS patients, aside from those already mentioned, was determined to be comparatively low in this review.

A random-effects model was utilised due to significant heterogeneity among trials ($I^2 > 50\%$). The results are presented in Table 3, organised by prevalence from highest to lowest.

Table 3: Other TCM Constitutions in PCOS Patients.

TCM Constitutions	Total PCOS Patient Number	I^2 (%)	Prevalence (%)	95% CI	P
Yang Deficiency	868	98.47	13	0.08~0.17	<0.0001
Damp Heat	865	89.89	12	0.09~0.14	<0.0001
Qi Stagnation	774	97.83	10	0.07~0.13	<0.0001
Balanced	489	99.63	8	0.04~0.12	<0.0001
Yin Deficiency	642	94.60	6	0.04~0.08	<0.0001
Inherited Special	431	95.17	3	0.02~0.05	<0.0001

Subgroup Analysis of the Distribution of TCM Constitution in Different Regions

Owing to the heterogeneity and an insignificant

outcome following the leave-one-out analysis, a regional subgroup analysis was conducted in alignment with the Chinese North-South Demarcation utilising Geographic

Information System, as established by Professor Chen Quangong and his students from Lanzhou University, alongside the Qinling-Huaihe Line proposed by Zhang Xiangwen.^[46] The regional classification is as follows: the northern regions encompass Xinjiang, Inner Mongolia, Ningxia, Qinghai, Gansu, Shaanxi, Shanxi, Shandong, Henan, Hebei, Tianjin, Beijing, Liaoning, Jilin, and Heilongjiang, whereas the South regions consist of Taiwan, Hainan, Macau, Hong Kong, Guangdong, Guangxi, Chongqing, Sichuan, Guizhou, Tibet, Yunnan, Fujian, Jiangxi, Hubei, Hunan, Anhui, Zhejiang, Shanghai, and Jiangsu. The meta-analysis was conducted exclusively on cross-sectional research, as all included case-control investigations were carried out in South China.

North China

The meta-analysis of 16 studies^[18,26-30,32-34,36,37,39,40,42,44,45]

indicated the predominance of Biased constitution in North China. A random-effects model was utilised due to significant heterogeneity among trials ($P > 50$). The analysis indicated that the prevalence of Phlegm Dampness and Qi Deficiency constitutions was 17% [95% CI: (0.13, 0.22)] and 18% [95% CI: (0.14, 0.22)], respectively, showing a statistically significant difference ($P < 0.0001$).

South China

Five studies^[31,35,38,41,43] reported the prevalence of Biased constitution in South China. Due to high heterogeneity across studies, a random-effects model was employed ($P > 50$). Referring to Table 4, the analysis revealed that the proportion of Phlegm Dampness, Damp Heat, Yang Deficiency and Qi stagnation were 21% [95% CI: (0.08, 0.33), $P < 0.0001$], 18% [95% CI: (0.12, 0.23), $P < 0.00001$], 17% [95% CI: (0.02, 0.32), $P = 0.03$] and 12% [95% CI: (0.01, 0.23), $P = 0.04$].

Table 4: TCM Constitutions Distribution in Different Study Region.

TCM Constitutions	North China					South China					Z	P
	Total Number	Prevalence (%)	95% CI	I ² (%)	P	Total Number	Prevalence (%)	95% CI	I ² (%)	P		
Balanced	444	8	0.03~0.12	99.67	<0.0001	45	8	-0.02~0.19	98.27	0.13	0.01	0.93
Yin Deficiency	632	7	0.05~0.09	94.03	<0.0001	10	1	0.00~0.02	0.09	0.03	28.08	<0.0001
Yang Deficiency	785	11	0.07~0.16	98.18	<0.0001	83	17	0.02~0.32	96.68	0.03	0.45	0.50
Qi Deficiency	1426	18	0.14~0.22	96.46	<0.0001	44	9	0.04~0.14	70.94	<0.0001	7.67	0.01
Qi Stagnation	706	9	0.06~0.12	96.83	<0.0001	68	12	0.01~0.23	96.62	0.04	0.21	0.65
Phlegm Dampness	1150	17	0.13~0.22	97.44	<0.0001	96	21	0.08~0.33	94.50	<0.0001	0.26	0.61
Damp Heat	781	10	0.08~0.12	89.22	<0.0001	84	18	0.12~0.23	61.21	<0.0001	5.98	0.01
Blood Stasis	1147	13	0.10~0.17	97.14	<0.0001	36	8	0.01~0.16	95.64	0.02	1.33	0.25
Inherited Special	430	4	0.03~0.06	95.25	<0.0001	1	1	-0.00~0.01	0.01	0.12	17.30	<0.0001

Publication Bias

Funnel plots were utilised to assess potential publication bias. The visual examination of the funnel plots indicated minor asymmetry, with the observed symmetry being adequate, suggesting possible bias. Despite attempts to discern potential sources of bias through the examination of the research, no apparent issues were detected. The funnel plots are described in the Supplementary Data.

DISCUSSION

This research encompassed four case-control studies with a total of 772 participants, comprising 266 individuals in the control group and 506 in the case group. The meta-analysis of case-control studies indicated that the prevalence of Phlegm Dampness and Damp Heat constitution is 2.76 times and 2.14 times more than that of healthy participants, respectively. The discovery suggests that these TCM constitutions may elevate the risk of PCOS. The Balanced constitution had a markedly lower risk of PCOS compared to other TCM constitutions, with a risk just 0.13 times greater than that of healthy subjects. This discovery suggests that a Balanced constitution may work as a preventive factor against PCOS, corroborating the theoretical notion that the internal balance and equilibrium of Qi, Blood, Yin, and Yang diminish an individual's susceptibility to certain predispositions.

A total of 7968 participants across 21 cross-sectional studies revealed that Phlegm Dampness (18%), Qi

Deficiency (16%), and Blood Stasis (12%) are the three most prevalent biased Traditional Chinese Medicine constitutions in patients with PCOS. The outcome diverges marginally from a comprehensive cross-sectional study by Wang Qi conducted between 2005 and 2007, which examined the distribution of TCM constitutions within the general Chinese population, revealing significantly elevated proportions of Qi deficiency, Damp Heat, and Yang deficiency compared to other TCM constitutions.^[47] These disparities suggest a possible connection between particular diseases and TCM constitution, underscoring the importance of exploring these relationships to enhance disease preventive and therapeutic strategies.

The Phlegm Dampness constitution consistently emerged as the most common TCM constitution among patients with PCOS. Previous research has demonstrated a significant correlation between phlegm-dampness and PCOS, establishing it as the principal pathogenic factor in the condition's development.^[26,28,30,48] PCOS is distinguished by the development of ovarian cysts, resulting from the aggregation of immature follicles that do not mature or ovulate.^[5,9,11] In the context of Traditional Chinese Medicine, this is ascribed to the obstruction of the Kidney-TianGui-Penetrating Vessel-Conception Vessel-Uterus axis by phlegm-dampness. Disruption of this axis results in ovarian dysfunction, characterised by menstrual cycle abnormalities, anovulation, and infertility, aligning with the clinical manifestations of

PCOS. The Essentials of Danxi's Prescriptions (Dan Xi Xin Fa), a seminal work by Zhu Dan-xi, asserts: "Amenorrhea is not attributable to insufficient blood, but rather to phlegm obstruction hindering normal flow."^[14,16] This emphasises that the buildup of phlegm-dampness impedes the movement of Qi and blood in the lower Jiao, resulting in many reproductive and metabolic disorders. The Blood Stasis constitution is highly associated with PCOS. Clinical investigations reveal that patients with PCOS and a Blood Stasis constitution often present with delayed or missing menstruation, insufficient menstrual flow accompanied by blood clots, and chronic pelvic pain.^[25] According to Traditional Chinese Medicine, compromised blood circulation leads to blood stasis, resulting in inadequate feeding of the reproductive system. Thus, this may lead to insufficient follicular development, anovulatory conditions, and cyst formation. Ultrasound imaging structural studies indicate that patients with PCOS exhibiting Blood Stasis constitution frequently present with enlarged ovarian volume and elevated follicle count, implying that inadequate blood circulation leads to ovarian congestion and cystic mass formation.^[49-50] Moreover, inadequate blood circulation, according to Western Medicine, may elevate the risk of metabolic problems, including obesity, hyperglycemia, and cardiovascular disease, which frequently co-occur in people with PCOS.^[5]

Different Types of PCOS

The Rotterdam Criteria 2003^[4] classifies PCOS into four subtypes based on the presence of oligo-anovulation (OA), hyperandrogenism (HA), and polycystic ovaries (PCO). This evaluation, based from three independent research,^[18,38,44] determined that the prevalence of various TCM constitutions differs among these subtypes. Qi deficiency was predominantly observed in PCOS phenotype I (OA+HA+PCO), Damp Heat in phenotype II (HA+PCO), Phlegm Dampness in phenotype III (OA+PCO), and Blood Stasis in phenotype IV (OA+HA). The subtype-specific distribution of TCM constitutions aligns with the overall correlations revealed in this analysis regarding TCM constitution and PCOS.

Table 4 indicates that the regional subgroup meta-analysis demonstrated that Qi Deficiency and Phlegm Dampness constitutions were the most common TCM constitution among PCOS patients in North China. In South China, the predominant TCM constitutions were Phlegm Dampness, Damp Heat, Yang Deficiency, and Qi Stagnation.

In North China, defensive Qi (Wei Qi) is crucial for safeguarding the body by sealing the skin's interstices (CouLi) to thwart the invasion of external pathogens, especially the widespread dryness and cold in this area, which can deplete Yin and Qi. The ongoing allocation of Qi for external defence, coupled with prolonged exposure, may exhaust essential Qi, thereby rendering an individual susceptible to a Qi Deficiency constitution. In colder environments, the body exhibits reduced sweating and a diminished metabolic rate to conserve heat, resulting

in the accumulation of internal phlegm-dampness and the development of a Phlegm Dampness constitution.^[51,52] In contrast, the warm and humid atmosphere of South China increases persons' vulnerability to external dampness, potentially leading to its internal buildup. This continual moisture impairs the Spleen and Stomach's ability to transport and transform fluids, resulting in the accumulation of phlegm-dampness throughout the body. Prolonged Qi stagnation may aggravate this illness, perhaps evolving into damp-heat if left unaddressed. This elucidates the prevalence of Phlegm Dampness, Damp Heat, and Qi Stagnation constitutions in South China.^[22,53] The persistent prevalence of the Phlegm-Dampness constitution among PCOS patients in both Northern and South China may be ascribed to its dual function as both a constitutional type and a principal cause in the development of PCOS.

These findings provide insight into the prevention and personalised therapy of PCOS. Considering the reported prevalence, it may be prudent to prioritise patients with Phlegm Dampness constitutions for targeted health education, lifestyle modifications, dietary adjustments, and early TCM therapies to reduce the incidence or progression of PCOS.

All four case-control studies were assessed as fair quality based on the NOS.^[21] This results from the lack of a description for the management of confounding factors to guarantee the consistency of cases and controls, whether in study design or analysis. The interviewees were not blinded to the case-control status. Exposure assessment was either inadequately detailed or depended exclusively on self-reports or medical documentation. Conversely, according to AHRQ guidelines, 19 cross-sectional studies were classified as medium quality, and 2 cross-sectional studies were assessed as low quality.^[20] Studies were evaluated as moderate quality due to absent data, including the assessment of confounding factors, clarification of missing data, inadequate patient information, rationale for patient exclusions, quality assurance protocols, and the population-based nature of the study cohort. Studies of low quality demonstrated all aforementioned problems, together with an absence of clearly delineated inclusion and exclusion criteria. The discrepancies in research methodology may contribute to biases in the results.

Limitations

Although a thorough search of several databases was performed, the restriction to Chinese language studies constrains the broader applicability of the findings to additional diverse groups. The overall quality of the included studies was assessed as varying from medium to low quality. In contrast to meta-analyses of clinical trials that typically benefit from standardised interventions and outcomes, the considerable heterogeneity noted in this meta-analysis regarding TCM constitution in PCOS may arise from various sources. These encompass disparities in geographical region, diagnostic criteria for PCOS, diagnostic

standards for TCM constitution, age, variations in sample size, and other possible confounding variables. Despite the implementation of stringent efforts to reduce heterogeneity, such as standardising diagnostic criteria for PCOS and TCM constitution, as well as performing subgroup analyses by geographical locations, considerable variability remained in the majority of research. This heterogeneity may be ascribed to the age and considerable variety in TCM constitutions among various PCOS subtypes. Significantly, most of the included studies failed to separate their analyses according to PCOS traits. Future research should encompass broad populations and utilise rigorous survey approaches to investigate variations in TCM constitution patterns among PCOS patients throughout different worldwide locations or ethnic contexts. To obtain more accurate insights, investigations studying PCOS should examine several age cohorts and subtypes. In the future, meticulous research and superior publishing are essential to bolster the current data.

CONCLUSION

A total of 25 papers were included, consisting of 4 case-control studies and 21 cross-sectional studies. The findings of this review reveal that the principal TCM constitutions associated with PCOS are Qi Deficiency, Phlegm Dampness, and Blood Stasis. Despite minor differences in the distribution of TCM constitution among geographical locations, the overall distribution basically remains stable. The results indicate that Phlegm Dampness, Damp Heat, and Blood Stasis constitutions may be linked to a heightened risk of PCOS. In contrast, the Balanced constitution may provide a safeguarding effect against the condition. Subsequent study should prioritise the investigation of varied demographics and subtype-specific studies of PCOS to strengthen the data on TCM constitutions among PCOS patients.

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