



Original Article

Non-pharmacological interventions of traditional Chinese medicine in treating polycystic ovary syndrome: a group consensus



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ABSTRACT

Background: To make a group consensus about non-pharmacological interventions of traditional Chinese medicine in treating polycystic ovary syndrome based on the previous guidelines, literature, and expert viewpoints.

Methods: Organized by Chinese Integrative Medicine & Traditional Chinese Medicine Academy, Chinese Maternal and Child Health Association, China, 29 experts from 18 Chinese provinces and 2 international experts, who specialize in gynecology, obstetrics, pediatrics, endocrinology, cardiovascular, psychology, reproductive genetics, nursing, acupuncture and tuina, traditional Chinese medicine, integrative medicine, and other disciplines, discussed and revised the recommendations one by one through in-person or online communication. Each recommendation was approved by $\geq 90\%$ of the experts before it could be established. The main outcome measure is an optimal clinical regimen for addressing the requirements of women with PCOS and improving their quality of life.

Result(s): The writing panel drafted the initial report, following a consensus process via adequate communication, which was then reviewed and revised by the consensus panel. This consensus provides 12 non-pharmacological interventions (including acupuncture, thumbtack needle, thread-embedding therapy, TEAS, AA, acupoint hot compress, cupping, acupressure, moxibustion, five elements music, aromatherapy, traditional Chinese exercises) for 8 phenotypes of PCOS, resulting in 34 items of clinical practice recommendations.

Conclusion(s): The consensus provides 12 non-pharmacological interventions of traditional Chinese medicine for 8 phenotypes of PCOS, resulting in 34 items of clinical practice recommendations, which may be improved by more high-quality multicenter clinical trials.

1. Introduction

Polycystic ovary syndrome (PCOS) is one of the most common reproductive endocrine diseases worldwide, with a prevalence rate of 8 % to 13 % (based on 2003 Rotterdam criteria).^{1,2} It may have negative health consequences for women, such as increased risk for metabolic (obesity, insulin resistance, cardiovascular disease, etc.), psychological (emotional disorders, sleeplessness), and reproductive disorders (ovulation failure, infertility, hyperandrogenemia, etc.).^{3,4} In addition to maternal consequences, PCOS can have a significant impact on its offspring, including neurological, metabolic, and reproductive issues.⁵⁻⁹ As a result, more emphasis should be placed on early treatment of PCOS to avoid double and long-term harm.

Treatment outcomes for women with PCOS that are addressed in line with evidence-based guidelines include improved emotional well-being, preserving their long-term health, enhancing their quality of life, or improving reproductive functions. Treatments outlined include lifestyle interventions as first-line, due to their capacity to improve multiple outcomes, as well as targeted pharmacotherapy, associated surgery and in vitro fertilization (IVF).

Non-pharmacological interventions of traditional Chinese medicine, as opposed to pharmacotherapy, are a set of methods that do not include the use of any currently available medications. Nowadays, these approaches are topical and frequently employed to treat PCOS in China and other countries.¹²⁻¹⁴ And it is widely acknowledged that non-pharmacological interventions may have less hazardous side effects, greater acceptance, and a lower economic burden than the medication treatment.¹⁵⁻²¹

However, there are currently no unified standard guidelines or consensus on non-pharmacological interventions of traditional Chinese medicine for patients with PCOS, which is urgently needed in complementary medicine. The present consensus emphasizes the development of a wide variety of mainstream non-pharmacological interventions for PCOS, as well as the PCOS clinical practice routine.

This consensus firstly suggests classifying non-pharmacological interventions of traditional Chinese medicine into three groups, namely invasive, contact, and non-contact interventions.

1.1. Invasive interventions

1.1.1. Acupuncture (manual and electroacupuncture)

Acupuncture has steadily gained recognition across the world with manual and electronic stimulation. Electroacupuncture (EA) is being more widely applied in clinical settings in China.^{22,23} This approach is based on traditional acupuncture, with an EA apparatus producing a

trace current which is in proximity to human bioelectricity (Fig. 1a).²⁴ The output current strength must be increased from small to large until the patient feels soreness, swelling, heat, and other sensations or a rhythmic contraction of local muscles. This process should take 15 to 30 min. In addition, EA is prohibited near the heart and the carotid sinus, or in patients with pacemakers.

1.1.1.1. Output current waveforms in EA.

1.1.1.1.1. Continuous wave. The fundamental pulse wave is straightforward and repeats without breaks. From dozens of waves per minute to hundreds of waves per second, the frequency may be continually adjusted. In general, continuous waves are referred to as sparse waves when their frequency is less than 30 Hz and as dense waves when their frequency is more than 30 Hz. Dense waves can readily impede sensory and motor nerves. short-term stimulation is beneficial for the restoration of neuromuscular function, but extended usage can block sensory and motor neurons.

1.1.1.1.2. Sparse-dense wave. Sparse-dense waves are those that alternate between sparse and dense waves, which alternate every 1.5 seconds on average. The disadvantages of a single wave type that is prone to tolerance can be solved by a sparse-dense wave. It has a stronger stimulating impact, and the excitatory effect is predominant during therapy.

1.1.1.1.3. Intermittent wave. This wave is an intermittent wave pattern with rhythm. When it is interrupted, there is no pulse power output for 1.5 seconds, and when it is continued, the dense wave works constantly for 1.5 seconds. The neuromuscular excitatory impact of this wave type is stronger than that of sparse-dense waves and continuous waves, and it is difficult for the body to bear.

It is widely accepted that acupuncture is effective in treating polycystic ovarian syndrome.²⁵⁻²⁷ EA can be used to treat any ailment that responds well to acupuncture alone.^{28,29}

1.1.2. Thumbtack needle (Fig. 1b)

The needle is an intradermal needle that resembles a thumbtack. To cure chronic and painful disorders, a particular little needle is inserted into the subcutaneous tissue of the acupuncture points.³⁰ It is defined by the sustained stimulation of acupuncture sites. At the same time, patients can compress themselves according to the demands of their condition to enhance the effectiveness of this intervention. Compared to acupuncture, needle pricking is easier, less painful, and shortens the length of a single visit, resulting in improved patient compliance.³¹⁻³²

1.1.3. Thread-embedding therapy (Fig. 1c)

Thread-embedding therapy is also known as catgut-embedding treatment. It is a method of treating diseases by inserting absorbable surgical

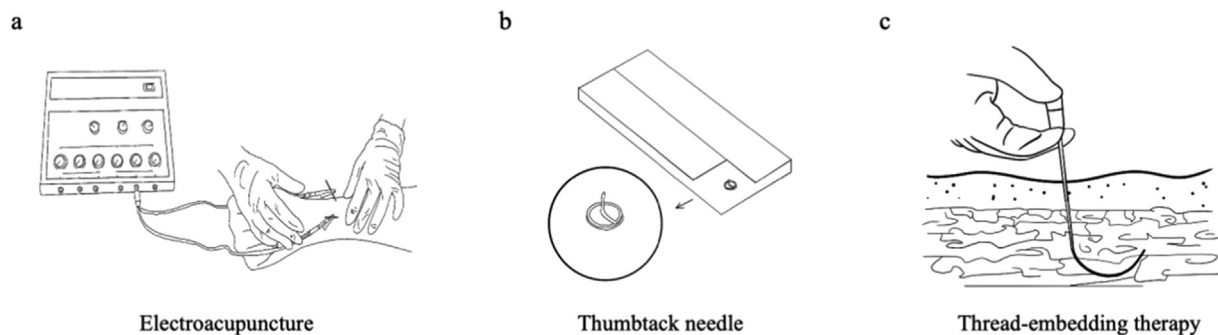


Fig. 1. Invasive interventions.

sutures into acupuncture points and stimulating the acupuncture points continuously with the threads. This approach offers a long-lasting impact, easy operation, and broad indications, making it particularly appropriate for obesity.^{33,34}

In brief, patients undergoing invasive intervention should be particularly aware of stressful emotional issues as they may result in little bleeding and significant stimulation. It is imperative that all processes adhere to aseptic standards.

1.2. Contact interventions

1.2.1. Transcutaneous electrical acupoint stimulation (TEAS) (Fig. 2a)

TEAS, similar to EA, is a method of treating disorders by applying electrical stimulation to acupuncture points that are adjacent to or overlap with nerves using electrodes. Its waveform, frequency, intensity, duration, and acupoint selection principles are identical to those of EA, with the exception that it is non-invasive. It is regarded as a new type of "digital acupuncture" intervention, combining the benefits of traditional medicine with modern technology. Due to its efficacy, non-invasiveness, and simplicity, it is also frequently employed in clinical practice and is a hotspot for future researchers.^{22,35-38}

1.2.2. Auricular acupressure (AA) (Fig. 2b)

AA is accomplished by affixing a medicine seed or tablet with a smooth, almost spherical surface to the middle of a square piece of tape approximately 0.5 cm in length. The patient may experience soreness, numbness, or warm in their ears once it is positioned in line with the auricular acupoints and squeezed. Following the application of the sticker, the patient is advised to compress for one to two minutes multiple times a day. Keep it for 3–5 days after each application, and the patient may take it off by himself. It is noteworthy to acknowledge the possibility of an adhesive tape allergy occurrence.

Traditional Chinese medicine believes that all human organs may find their place on the ear. The human body often responds to illness in the appropriate pinna acupuncture points. As a result, stimulating these corresponding reaction points and acupuncture points can play a role in curing diseases. Interestingly, the specific distribution of acupuncture points resembles that of an inverted human body, as seen in the figure.

1.2.3. Acupoint hot compress (Fig. 2c)

Acupoint hot compress therapy involves transferring heat energy to acupuncture sites. It is typically made up of a raw material layer, a gelatin layer, and a non-woven bag that is applied to the skin's surface. The process works on the premise of using a galvanic cell to accelerate the oxidation reaction and transfer chemical energy into thermal energy. Mineral materials are utilized to maintain the temperature stable for an extended period of time. To avoid burns, keep the temperature and length of usage under control. Simultaneously, delicate regions such as the head, face, and damaged skin must be avoided.

1.2.4. Cupping

Cupping is a therapy procedure in which the can is adsorbed to a specific region of the acupoint or body surface, causing local skin congestion or stasis. The horns of animals were originally used as cans and have gradually developed into cans constructed of a variety of materials, including bamboo cans, metal cans, ceramic cans, glass cans, and gas extraction cans.

1.2.4.1. Types of cupping. In clinical practice, two types of cupping adsorption are frequently utilized.

1.2.4.1.1. Fire cupping method (Fig. 2d). Burning 95 % ethanol cotton balls heats the air within the can. the negative pressure created as the air in the can cools is utilized to adsorb the can onto the body surface.

1.2.4.1.2. Pumping cupping method (Fig. 2e). A mechanical mechanism drains a portion of the air in the can to create negative pressure, allowing the can to be adsorbed on the body surface.

When cupping, it is important to select a proper posture and a portion with reasonably full muscles. The tank will come off with ease if the body is ill-posed, the bones are uneven, or the hair is excessive. Furthermore, burns from ethanol drips must be avoided while utilizing the fire cupping method.

1.2.5. Acupressure

Acupressure is also known as massage. This type of intervention involves the use of certain massage techniques or tools by a massage physician to target acupuncture points or particular body areas in order to cure various illnesses. Many countries throughout the world advocate massage for health care, and China is no exception. From a clinical standpoint, the most important aspects of massage are the selection of acupuncture points, the choice of techniques, the quantity, the frequency, and the operator's skill.

To summarize, contact interventions provide a high level of stimulus as well. As a result, caution is required to prevent skin allergies and issues with damage during the procedure. TEAS and AA are now the most widely utilized contact interventions for PCOS that involve clinical interaction.

1.3. Non-contact interventions

1.3.1. Moxibustion

Moxibustion refers to a technique for treating disease by using the heat of a moxibustion fire to cauterize and iron acupuncture points. Dried moxa leaves make up the majority of the primary materials that are burned.

1.3.1.1. The forms of non-contact moxibustion techniques.

1.3.1.1.1. Indirect moxibustion (Fig. 3a). It refers to the method of using drugs or other materials to separate moxibustion from the skin of the moxibustion acupoints. ginger is typically used as an isolated material

1.3.1.1.2. Moxa stick moxibustion (Fig. 3b). Dried mugwort leaves formed into a cylindrical form are called moxa sticks. one end of the moxa stick is lit to transfer mild heat at a specific height away from the acupoint or the affected area. it is kept fixed or moved up and down, left and right, and in a circle.

1.3.1.1.3. Needle-warming moxibustion (Fig. 3c). This technique blends moxibustion and acupuncture. when the needle is left behind, it refers to the process of moxibustion using moxa wool (or 2–3cm moxa strips) on the needle handle. To avoid burning clothing and skin due to falling moxa wool, greater caution should be taken during the moxibustion process.

1.3.2. Five elements music (Fig. 3d)

Numerous scientific studies have demonstrated that music is not only a form of art but also a unique tool for illness treatment.^{39,40} The Five Elements Theory and Music in Traditional Chinese Medicine are combined to create Five Elements Music. There were just five tones in traditional Chinese music: Jiao, Zhi, Gong, Shang, and Yu. According to ancient Chinese philosophy, these five scales represent the five elements: wood (Jiao), fire (Zhi), earth (Gong), jin (Shang), and water (Yu), which corresponding treatment of liver, heart, spleen, lung, kidney related diseases. The majority of musical instruments utilized include the Chinese zither, guqin, chime, sheng, bamboo flute, gourd silk, and others with traditional Chinese features.

1.3.3. Aromatherapy (Fig. 3e)

The main way that traditional Chinese aromatherapy uses plant aromas to manage both physical and mental health is through inhalation and other means.^{41–43} Plants having a distinct perfume are prepared into little sachets and placed in the vicinity of one's activities. Aromatherapy offers the advantages of being natural and nontoxic, ease of use, affordability, and effective.

1.3.4. Traditional Chinese exercises

Exercises practiced in traditional Chinese medicine include Qigong, Tai Chi, Ba Duan Jin, Wu Qin Xi, and Yi Jin Jing. The health advantages of exercise are well acknowledged globally.^{44–48} The unique feature is that moderate activity is recommended by traditional Chinese medicine, and it is preferable to sweat slightly rather than excessively. Furthermore, it is considered that the optimum time to exercise is in the summer, while winter should be avoided.

2. Methods

2.1. Process of consensus (Fig. 4)

2.1.1. Consult the previous consensus and guidelines

Recommendations from the international evidence-based guideline for the assessment and management of PCOS (2018),¹¹ Chinese guideline for diagnosis and management of PCOS (2018),⁴⁹ Consensus on infertility management and fertility preservation related to PCOS (2020),⁵⁰ Recommendations from the 2023 international evidence-based guideline for the assessment and management of PCOS,¹⁰ Expert consensus on the pathway of diagnosis and management of PCOS (2023),⁵¹ Diagnosis and treatment of PCOS by integrative medicine (2024),⁵² and a variety of different national and international guidelines and consensus were considered.

2.2. Review of the literature

2.2.1. Searching the literature and data sources

The databases include PubMed, Web of Science, EMBASE, CINAHL, Cochrane (Cochrane central register of controlled trials), China Knowledge Resources Database (CNKI), Chinese Science and Technology Journal Database (Chongqing Vip), China Academic Journal Database (Wanfang Data), Airiti Library, China Biomedical Literature Service System

(SinoMed), the U.S. Clinical Trials Database ([ClinicalTrials.gov](https://clinicaltrials.gov)) and the Chinese Clinical Trials Registry (www.chictr.org.cn). The search period for the literature was from the database's creation until May 31, 2024, and the search language was restricted to Chinese and English.

Search terms: Traditional Chinese medicine, acupuncture, EA, TEAS, AA, auriculotherapy, dry needling, moxibustion, cupping, fumigation, naturopathy, acupoint application, hot compress, external treatment, acupoint catgut embedding, thread-embedding therapy, acupressure, baths, hyperthermia, massage, tuina, acupoint hot compress, thumbtack needle, music therapy, five elements music, aromatherapy, traditional Chinese exercises, Qigong, Tai Chi, Ba Duan Jin, Wu Qin Xi, Yi Jin Jing, polycystic ovary syndrome, polycystic ovarian syndrome, ovary polycystic disease, oligomenorrhea, oligoanovulatory, amenorrhea, hyperandrogenism, hyperandrogen, ovulation disorders, ovulatory dysfunction, anovulation, IVF, insulin resistance, obesity, obese, emotional disorders, depression, anxiety, sleeplessness, sleep disorders.

2.2.2. Literature inclusion and exclusion criteria

2.2.2.1. Inclusion criteria

All clinical studies on the application of integrated traditional Chinese and western medicine or/and traditional Chinese medicine treatment or/and nursing or/and appropriate techniques of traditional Chinese medicine for PCOS were eligible. Systematic review, randomized controlled trials, cohort studies, case-control studies, cross-sectional studies, case series, case reports, single arm studies, and expert experience were included.

2.2.2.2. Exclusion criteria

Non-clinical studies and those without clinical efficacy recorded were excluded.

2.3. Expert viewpoints

Insufficient sample size, research design faults, and discrepancies in efficacy evaluation criteria in PCOS studies may result in varied levels of bias and failure to fulfill guideline formulation standards.

Following the modified Delphi principle and the PICO principle (patient, intervention, comparison, outcome),^{53,54} the writing panel made the first draft based on clinical experiences, evidence in the literature, and operational practicality. Then the consensus panel discussed and revised the recommendations one by one through in-person or online communication. Worldwide clinical specialists were also invited to join the modification of the consensus. Each recommendation was approved by $\geq 90\%$ of the experts before it could be established.

A total of 29 experts from 18 Chinese provinces and 2 international experts contributed insightful commentary and support to the development of this consensus. They specialize in gynecology, obstetrics, pediatrics, endocrinology, cardiovascular, psychology, reproductive genetics, nursing, acupuncture and tuina, traditional Chinese medicine, integrative medicine, and other disciplines.

3. Results

The recommended regimens for PCOS with non-pharmacological interventions of traditional Chinese medicine:

3.1. Menstrual disorders

3.1.1. Acupuncture (manual and EA)

Acupuncture after menstruation or bleeding from hormone discontinuation is advised. The first set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Mingmen (DU4), Yaoyangguan (DU3), and Shenshu (BL23). The second set of acupuncture points includes Zhongwan (RN12), Guanyuan (RN4), Zhongji (RN3), Zusanli (ST36), Sanyinjiao (SP6), Xuehai (SP10), and Taixi (KI3). Taichong (LR3) and Qimen (LR14) are recommended for stagnation of liver qi, Fenglong (ST40) and

Yinlingquan (SP9) for phlegm-dampness, and Geshu (BL17) and Ciliao (BL32) for blood stasis. The two groups of acupuncture points are treated alternately. Each time, two to four acupoints can be chosen for electrical stimulation using a continuous wave of 2 Hz. The intensity of the stimulation is tolerable, and the needle is left for 30 min, once every other day. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.1.2. TEAS

TEAS after menstruation or bleeding from hormone discontinuation is advised. The paired acupuncture points: Jizhong-Dazhui (DU6-DU14), Zhongwan-Guanyuan (RN12-RN4), and Sanyinjiao-Xuehai (SP6-SP10). Shenshu-Shenshu (BL23-BL23) are recommended for kidney deficiency, Taichong-Yanglingquan (LR3-GB34) for stagnation of liver, Fenglong-Zusanli (ST40-ST36) for phlegm-dampness, and Geshu-Geshu (BL17-BL17) for blood stasis. The intensity of the electrical stimulation is tolerable with a continuous wave of 2 Hz, and the electrodes are left for 30 min every other day. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.1.3. AA

The recommended set of acupuncture points: Liver (CO12), Spleen (CO13), Kidney (CO10), and Endocrine (CO18). Stick to and press each auricular acupoint on one side for about 1 minute, 3–5 times daily. It is advisable to cause warm, numbness, swelling and soreness in the auricular acupoints, and keep it for 3–5 days. Alternate binaural regimen for 1 month.

3.1.4. Acupoint hot compress

Acupoint hot compress after menstruation or bleeding from hormone discontinuation is advised. The recommended set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Guanyuan (RN4), and Yongquan (KI1). Shenshu (BL23) and Mingmen (DU4) are recommended for kidney deficiency, Taichong (LR3) and Qimen (LR14) for stagnation of liver, Fenglong (ST40) and Zusanli (ST36) for phlegm-dampness, and Geshu (BL17) and Ciliao (BL32) for blood stasis. For a two-week period, the ideal temperature is $(42\pm 2)^{\circ}\text{C}$ for four hours daily.

3.1.5. Moxibustion

Moxibustion after menstruation or bleeding from hormone discontinuation is advised. The recommended set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Zhongwan (RN12), Zusanli (ST36), and Shenshu (BL23). Cauterize each acupoint for 5–10 min, 2–3 times a week. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.2. Hyperandrogen

3.2.1. Acupuncture (manual and EA)

Acupuncture after menstruation or bleeding from hormone discontinuation is advised. The first set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Pishu (BL20), Weishu (BL21), and Geshu (BL17). The second set of acupuncture points includes Zhongwan (RN12), Guanyuan (RN4), Zhongji (RN3), Quchi (LI11), Sanyinjiao (SP6), and Yinlingquan (SP9). Shenshu (BL23) and Taixi (KI3) are recommended for kidney deficiency, Taichong (LR3) and Qimen (LR14) for stagnation of liver, Fenglong (ST40) and Zusanli (ST36) for phlegm-dampness, and Xuehai (SP10) and Ciliao (BL32) for blood stasis. The two groups of acupuncture points are treated alternately. Each time, two to four acupoints can be chosen for electrical stimulation using a sparse-dense wave of 2/100 Hz. The intensity of the stimulation is tolerable, and the needle is left for 30 min, once every other day. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.2.2. TEAS

TEAS after menstruation or bleeding from hormone discontinuation is advised. The paired acupuncture points: Jizhong-Dazhui (DU6-DU14), Zhongwan-Shuifen (RN12-RN9), Guanyuan-Zhongji (RN4-RN3), and Sanyinjiao-Zusanli (SP6-ST36). Shenshu-Shenshu (BL23-BL23) are recommended for kidney deficiency, Taichong-Yanglingquan (LR3-GB34) for stagnation of liver, Fenglong-Yinlingquan (ST40-SP9) for phlegm-dampness, and Geshu-Geshu (BL17-BL17) for blood stasis. The intensity of the electrical stimulation is tolerable with a sparse-dense wave of 2/100 Hz, and the electrodes are left for 30 min every other day. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.3. Ovulation disorders

3.3.1. Acupuncture (manual and EA)

Acupuncture after menstruation or bleeding from hormone discontinuation is advised. The first set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Mingmen (DU4), Yaoyangguan (DU3), and Shenshu (BL23). The second set of acupuncture points includes Zhongwan (RN12), Xiawan (RN10), Qihai (RN6), Guanyuan (RN4), Zigong (EX-CA1), Zusanli (ST36), Sanyinjiao (SP6), Xuehai (SP10), and Taichong (LR3). The two groups of acupuncture points are treated alternately. Each time, two to four acupoints can be chosen for electrical stimulation using a continuous wave of 2 Hz. The intensity of the stimulation is tolerable, and the needle is left for 30 min once every other day until the following menstrual cycle begins or the diagnosis of pregnancy. The regimen is continuous for two to three menstrual cycles.

3.3.2. TEAS

TEAS after menstruation or bleeding from hormone discontinuation is advised. The paired acupuncture points: Jizhong-Dazhui (DU6-DU14), Zhongwan-Zigong (RN12-EX-CA1), Guanyuan-Zigong (RN4-EX-CA1), and Sanyinjiao-Zusanli (SP6-ST36). The intensity of the electrical stimulation is tolerable with a continuous wave of 2 Hz, and the electrodes are left for 30 min every other day until the following menstrual cycle begins or the diagnosis of pregnancy. The regimen is continuous for two to three menstrual cycles.

3.3.3. Moxibustion

Moxibustion after menstruation or bleeding from hormone discontinuation is advised. The recommended set of acupuncture points: Shenque (RN8), Zhongwan (RN12), Guanyuan (RN4), Shenshu (BL23), Pishu (BL20), Zusanli (ST36), and Sanyinjiao (SP6). Cauterize each acupoint for 5–10 min, 2–3 times a week until the following menstrual cycle begins or the diagnosis of pregnancy. The regimen is continuous for two to three menstrual cycles.

3.4. IVF

3.4.1. Acupuncture (manual and EA)

Acupuncture is recommended after menstruation or bleeding induced by hormone discontinuation, one menstrual cycle before transplanting. The first set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Mingmen (DU4), Shenshu (BL23), and Ciliao (BL32). The second set of acupuncture points includes Zhongwan (RN12), Guanyuan (RN4), Zigong (EX-CA1), Zusanli (ST36), Sanyinjiao (SP6), Xuehai (SP10), and Taixi (KI3). The two groups of acupuncture points are treated alternately. Each time, two to four acupoints can be chosen for electrical stimulation using a continuous wave of 2 Hz. The intensity of the stimulation is tolerable, and the needle is left for 30 min, once every other day until the date of embryo transfer.

3.4.2. TEAS

TEAS is recommended 24 hours before egg retrieval and 2 hours before embryo transfer. The paired acupuncture points: Xuehai-Diji (SP10-SP8), Taichong-Zusanli (LR3-ST36), Guanyuan-Zigong (RN4-EX-CA1),

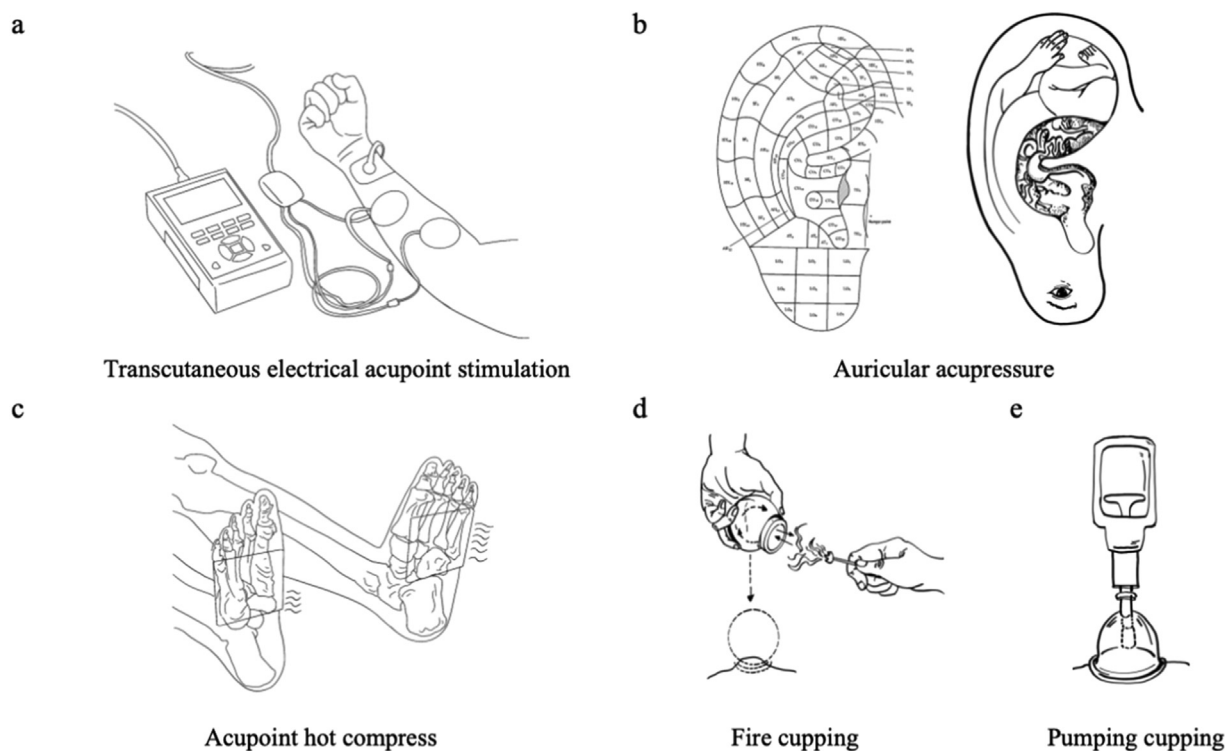


Fig. 2. Contact interventions.

and Zhongwan-Zigong (RN12-EX-CA1). The intensity of the electrical stimulation is tolerable with a sparse-dense wave of 2/100 Hz, and the electrodes are left for 30 min every time.

3.4.3. AA

AA is recommended 24 hours before egg retrieval. The recommended set of acupuncture points: Shenmen (TF4), Endocrine (CO18), and Internal genitalia (TF2). Stick to and press each auricular acupoint on one side for about 1 minute, 4 times daily (8:00,12:00,16:00,20:00). It is advisable to cause warm, numbness, swelling and soreness in the auricular acupoints, and keep until 20:00 on the next day of transplantation. The therapy period is six days.

3.5. Insulin resistance

3.5.1. Acupuncture (manual and EA)

Acupuncture after menstruation or bleeding from hormone discontinuation is advised. The first set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Pishu (BL20), and Weiwanshiashu (EX-B3). The second set of acupuncture points includes Zhongwan (RN12), Taiyuan (LU9), Guanyuan (RN4), Sanyinjiao (SP6), Taixi (KI3), and Neiting (ST44). Zhaohai (KI6) and Shenshu (BL23) are recommended for kidney deficiency, Taichong (LR3) and Xingjian (LR2) for stagnation of liver, Fenglong (ST40) and Yinlingquan (SP9) for phlegm-dampness, and Xuehai (SP10) and Geshu (BL17) for blood stasis. The two groups of acupuncture points are treated alternately. Each time, two to four acupoints can be chosen for electrical stimulation using a sparse-dense wave of 2/100 Hz. The intensity of the stimulation is tolerable, and the needle is left for 30 min, once every other day. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.5.2. Thumbtack needle

The recommended set of acupuncture points: Endocrine (CO18), Sanjiao (CO17), and Hunger point (Fig. 2b). Bury one side of the needle and leave it for 2–3 days, once every week. Alternate between the two ears and continue therapy for one month.

3.5.3. TEAS

TEAS after menstruation or bleeding from hormone discontinuation is advised. The paired acupuncture points: Jizhong-Dazhui (DU6-DU14), Zhongwan-Guanyuan (RN12-RN4), and Sanyinjiao-Yinlingquan (SP6-SP9). Taixi-Zhaohai (KI3-KI6) are recommended for kidney deficiency, Taichong-Xingjian (LR3-LR2) for stagnation of liver, Zusanli-Fenglong (ST36-ST40) for phlegm-dampness, and Xuehai-Diji (SP10-SP8) for blood stasis. The intensity of the electrical stimulation is tolerable with a sparse-dense wave of 2/100 Hz, and the electrodes are left for 30 min every other day. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.5.4. AA

The recommended set of acupuncture points: Pancreas (CO11), Endocrine (CO18), and Subcortical (AT4). Stick to and press each auricular acupoint on one side for about 1 minute, 3–5 times daily. It is advisable to cause warm, numbness, swelling and soreness in the auricular acupoints, and keep it for 3–5 days. Alternate binaural regimen for 1 month.

3.6. Obesity

3.6.1. Acupuncture (manual and EA)

Acupuncture after menstruation or bleeding from hormone discontinuation is advised. The first set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Pishu (BL20), and Weishu (BL21). The second set of acupuncture points includes Zhongwan (RN12), Guanyuan (RN4), Tianshu (ST25), Daheng (SP15), Zhigou (SJ6), Zusanli (ST36), Fenglong (ST40), and Sanyinjiao (SP6). Mingmen (DU4) and Shenshu (BL23) are recommended for kidney deficiency, Taichong (LR3) and Qimen (LR14) for stagnation of liver, Shuidao (ST28) and Guilai (ST29) for phlegm-dampness, and Xuehai (SP10) and Geshu (BL17) for blood stasis. The two groups of acupuncture points are treated alternately. Each time, two to four acupoints can be chosen for electrical stimulation using a sparse-dense wave of 2/100 Hz. The intensity of the stimulation is tolerable, and the needle is left for 30 min, once every other day. The regimen is

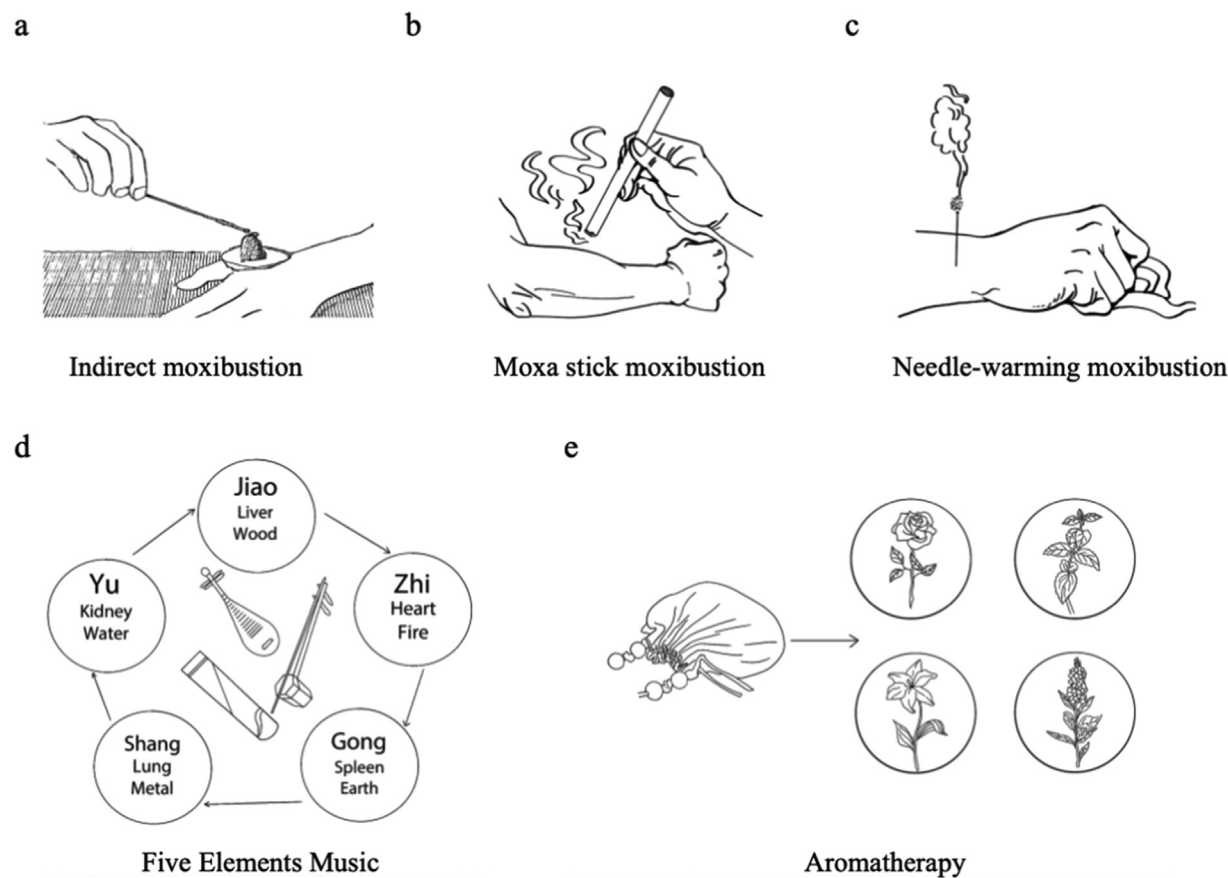


Fig. 3. Non-contact interventions.

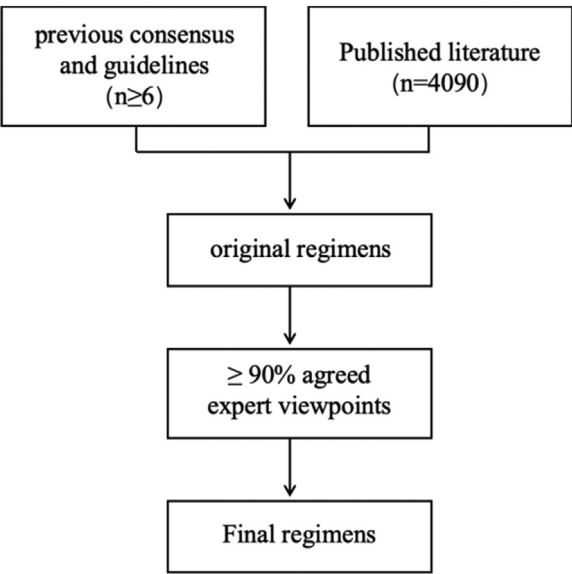


Fig. 4. Process of the consensus.

continuous for two to three menstrual cycles, excluding the menstrual phase.

3.6.2. Thread-embedding therapy

The recommended set of acupuncture points: Zhongwan (RN12), Xiawan (RN10), Tianshu (ST25), Daheng (SP15), Daimai (GB26), Qihai

(RN6), Guanyuan (RN4), Shuidao (ST28), and Guilai (ST29). One regimen every two weeks for three months.

3.6.3. TEAS

TEAS after menstruation or bleeding from hormone discontinuation is advised. The paired acupuncture points: Jizhong-Dazhui (DU6-DU14), Zhongwan-Tianshu (RN12-ST25), Zhongji-Tianshu (RN3-ST25), and Fenglong-Yinlingquan (ST40-SP9). Shenshu-Shenshu (BL23-BL23) are recommended for kidney deficiency, Taichong-Xingjian (LR3-LR2) for stagnation of liver, Zusanli-Fenglong (ST36-ST40) for phlegm-dampness, and Xuehai-Diji (SP10-SP8) for blood stasis. The intensity of the electrical stimulation is tolerable with a sparse-dense wave of 2/100 Hz, and the electrodes are left for 30 min every other day. The regimen is continuous for two to three menstrual cycles, excluding the menstrual phase.

3.6.4. AA

The recommended set of acupuncture points: Spleen (CO13), Stomach (CO4), Sanjiao (CO17), and Hunger point. Stick to and press each auricular acupoint on one side for about 1 minute, 3–5 times daily. It is advisable to cause warm, numbness, swelling and soreness in the auricular acupoints, and keep it for 3–5 days. Alternate binaural regimen for 1 month.

3.6.5. Cupping

The recommended set of acupuncture points: Jizhong (DU6), Dazhui (DU14), Zhongwan (RN12), Zhongji (RN3), and Daimai (GB26). Shenshu (BL23) is recommended for kidney deficiency, Ganshu (BL18) for stagnation of liver, Tianshu (ST25) and Guilai (ST29) for phlegm-dampness, and Geshu (BL17) for blood stasis. The cans are left for 10 min once a week for 1 month of continuous therapy.

3.6.6. Traditional Chinese exercises

It is recommended to do Tai Chi, Ba Duan Jin, Wu Qin Xi, and Yi Jin Jing exercises on open flat land (preferably outdoors), alternating or continuing a certain type of exercise. Exercise for 30–60 min a day for 3–6 months, and menstruation can reduce the duration of exercise.

3.7. Emotional disorders

3.7.1. Acupuncture (manual and EA)

The recommended set of acupuncture points: Baihui (DU20), Shenting (DU24), Shenmen (HT7), Daling (PC7), Neiguan (PC6), Zusanli (ST36), Sanyinjiao (SP6) and Taichong (LR3). Taixi (KI3) is recommended for kidney deficiency, Qimen (LR14) for stagnation of liver, Fenglong (ST40) for phlegm-dampness, and Xuehai (SP10) for blood stasis. Yintang (EX-HN3) is recommended for anxiety, Danzhong (RN17) for depression. Leave the needle for 30 min twice to three times a week for 1–2 months of continuous therapy.

3.7.2. TEAS

The paired acupuncture points: Jizhong-Dazhui (DU6-DU14), Zhongwan-Danzhong (RN12-RN17), Neiguan-Hegu (PC6-LI4), and Zusanli-Taichong (ST36-LR3). Shenshu-Shenshu (BL23-BL23) are recommended for kidney deficiency, Ganshu-Ganshu (BL18-BL18) for stagnation of liver, Fenglong-Yinlingquan (ST40-SP9) for phlegm-dampness, and Xuehai-Sanyinjiao (SP10-SP6) for blood stasis. The intensity of the electrical stimulation is tolerable with a sparse-dense wave of 2/100 Hz, and the electrodes are left for 30 min every other day. The regimen is continuous for one to two menstrual cycles.

3.7.3. AA

The recommended set of acupuncture points: Shenmen (TF4), Endocrine (CO18), Internal genitalia (TF2). Stick to and press each auricular acupoint on one side for about 1 minute, 3–5 times daily. It is advisable to cause warm, numbness, swelling and soreness in the auricular acupoints, and keep it for 3–5 days. Alternate binaural regimen for 1–2 month.

3.7.4. Five elements music

Refer to Traditional Chinese Five Elements Music: Orthotonal Style.⁵⁵ To cure depressive illnesses, choosing melodic high-pitched, bright, and smooth Jiao music are appropriate, such as "Liezi Yufeng" and "Zhuangzhou Mengdie". To cure anxiety problems, selecting tranquil, subtle, quiet and deep Yu music are appropriate, such as "Wuyeti" and "Zhizhaofei". Wear headphones and listen at a suitable volume of 20–40 dB for 15 min once a day for 1–2 month of continuous therapy.

3.7.5. Aromatherapy

Drain, combine, and place one or more fragrant plants (roses, mint, bergamot, gardenias, acacias, lavender, cloves, agarwood, sandalwood, etc.) in a fabric and ventilate bag. Crushing the plants might intensify their scent, but it shouldn't put an excessive amount of powder in the container. Replace it once a month for three to six months, either by carrying it with you or storing it indoors.

3.7.6. Traditional Chinese exercises

It is recommended to do Tai Chi, Ba Duan Jin, Wu Qin Xi, and Yi Jin Jing exercises on open flat land (preferably outdoors), alternating or continuing a certain type of exercise. Exercise for 20–30 min a day for 2–3 months, and menstruation can reduce the duration of exercise.

3.8. Sleep disorders

3.8.1. Acupuncture (manual and EA)

The recommended set of acupuncture points: Baihui (DU20), Anmian (Supplement Fig. 1), Shenmen (HT7), Neiguan (PC6), Zusanli (ST36), Sanyinjiao (SP6), Zhaohai (KI6), and Shenmai (BL62). Taixi

(KI3) and Fuli (KI7) are recommended for kidney deficiency (somnolence), Shuidao (ST28) and Guilai (ST29) for phlegm-dampness (somnolence), Taichong (LR3) and Qimen (LR14) for stagnation of liver (insomnia), and Xuehai (SP10) and Yinlingquan (SP9) for blood stasis (insomnia). Yintang (EX-HN3) is recommended for anxiety, Danzhong (RN17) for depression. Leave the needle for 30 min twice to three times a week for 1–2 months of continuous therapy.

3.8.2. TEAS

The paired acupuncture points: Jizhong-Dazhui (DU6-DU14), Zhongwan-Guanyuan (RN12-RN4), Xinshu-Pishu (BL15-BL20), Neiguan-Hegu (PC6-LI4), and Sanyinjiao-Taichong (SP6-LR3). Shenshu-Shenshu (BL23-BL23) are recommended for kidney deficiency, Ganshu-Ganshu (BL18-BL18) for stagnation of liver, Fenglong-Yinlingquan (ST40-SP9) for phlegm-dampness, and Xuehai-Diji (SP10-SP8) for blood stasis. The intensity of the electrical stimulation is tolerable with a continuous wave of 2 Hz, and the electrodes are left for 30 min twice to three times a week for 1–2 months of continuous therapy.

3.8.3. AA

The recommended set of acupuncture points: Heart (CO15), Shenmen (TF4), Endocrine (CO18), and Subcortical (AT4). Stick to and press each auricular acupoint on one side for about 1 minute, 3–5 times daily. It is advisable to cause warm, numbness, swelling and soreness in the auricular acupoints, and keep it for 3–5 days. Alternate binaural regimen for 1–2 month.

3.8.4. Acupressure

The recommended set of acupuncture points: Baihui (DU20), Yintang (EX-HN3), Taiyang (EX-HN5), Touwei (ST8), Fengchi (GB20), and Anmian. Taixi (KI3) is recommended for kidney deficiency, Taichong (LR3) for stagnation of liver, Fenglong (ST40) for phlegm-dampness, and Sanyinjiao (SP6) for blood stasis. Massage each acupoint for 1–2 min, 2 times a day for 1 month of continuous therapy.

3.8.5. Traditional Chinese exercises

It is recommended to do Tai Chi, Ba Duan Jin, Wu Qin Xi, and Yi Jin Jing exercises on open flat land (preferably outdoors), alternating or continuing a certain type of exercise. Exercise for 20–30 min a day for 2–3 months, and menstruation can reduce the duration of exercise.

4. Discussion

This consensus for non-pharmacological interventions of traditional Chinese medicine in treating PCOS aims to establish an optimal, consistent clinical regimen that provides medical professionals with a high-quality, dependable source of direction for addressing the requirements of women with PCOS and improving their quality of life.

All recommended regimens were formulated after an assessment of the available evidence, multidisciplinary experts viewpoints, consumer preferences and structured by the consensus panel. The consensus provides 12 non-pharmacological interventions (including acupuncture, thumbtack needle, thread-embedding therapy, TEAS, AA, acupoint hot compress, cupping, acupressure, moxibustion, five elements music, aromatherapy, traditional Chinese exercises) for 8 phenotypes of PCOS, resulting in 34 items of clinical practice recommendations.

There are several variations of current PCOS recommendations, covering both medication treatment and lifestyle management. However, to the best of our knowledge, no one has developed an international consensus or guidelines for non-pharmacological interventions of traditional Chinese medicine. This might be blamed on a lack of research data, normativeness, authority, and multidisciplinary collaboration. Consequently, for the first time, we have proposed a consensus on this issue.

Consistent to 'Recommendations from the 2023 international evidence-based guideline for the assessment and management of

PCOS¹⁰, this consensus addresses not just long-term reproductive health (anovulation, subfertility, menstrual disorders), but also metabolic alterations (hyperandrogen, insulin resistance, obesity). Simultaneously, we highlight the complementary role that non-pharmacological interventions play in the use of the assisted reproductive technology. It is few mentioned in many recommendations and research. Furthermore, based on input from patients and peer experts, we have placed the intervention emphasis on quality of life (emotional disorders, especially sleep disorders). To the best of our knowledge, sleep problems receive insufficient attention in the majority of the research and recommendations, which is a part of the flaws in clinical treatment. This complexity warrants our increased attention. Therefore, we advocate incorporating more patients feedback in future guideline formulation.

The five element music is a characteristic of this consensus. According to classical Chinese medicine theories, the five element music correlate to the five elements (wood, fire, earth, metal, and water), as well as the five organs (liver, heart, spleen, lung, and kidney) and the five emotions (anger, joy, thinking, sadness, and fear). Each style of music has its own set of components, including melody, rhythm, and harmony. The repertoire is selected based on the music's specific features for regulating emotions, organs, and balancing yin and yang. It is one of the unique non-pharmacological interventions and might become an intriguing field for future research.

A supported healthy lifestyle still remains essential throughout the lifespan in PCOS. This consensus adds traditional Chinese exercises to focus on weight management. It is different from the way most people perceive as exercise. In general, traditional Chinese exercises have a wide range of movements, but moves slowly, and it is a dynamic balance that considers both motion and motionlessness. To guarantee the efficacy and accuracy of the activity, the patient must master it, ideally under the guidance of a qualified exercise practitioner. This can create barriers for both healthcare providers and patients, such as time constraints and specialized knowledge.

Overall, non-pharmacological interventions of traditional Chinese medicine are more than just lifestyle modification. It also contains powerful therapeutic strategies that require expert medical supervision. As a result, we highly urge that for women with PCOS, non-pharmacological interventions be interspersed with lifestyle management and medication. In line with the consensus developed by our multidisciplinary group, improving clinical practice and embracing patients' health demands can assist optimize regimens and enhance long-term health results. This initiative can serve as a model for international engagement and healthcare impact.

4.1. Strengths and limitations

The strength of this consensus is that it is the first consensus to novelly summarize the non-pharmacological intervention of traditional Chinese medicine in the treating PCOS. And it particularly focuses on sleep and psychological features. The incorporation of five elements music and traditional Chinese exercises is a unique component of PCOS treatment.

As to potential limitations, first, only 2 international experts were recruited in this consensus. And the participating experts do not cover all of the provinces in China. Second, not all the symptoms of PCOS were recommended by the experts to be treated with non-pharmacological interventions of traditional Chinese medicine, such as acne and hirsutism. Third, there are no hierarchical suggestions in the all recommended regimens. Finally, only the mainstream non-pharmacological interventions of traditional Chinese medicine are included. These limitations may result in a lack of comprehensiveness in the recommendations, making it difficult for practitioners to select appropriate regimens.

4.2. Conclusion

The consensus provides 12 non-pharmacological interventions of traditional Chinese medicine for 8 phenotypes of PCOS, resulting in 34

items of clinical practice recommendations, which may be improved by more high-quality multicenter clinical trials.

Author contributions

Conceptualization: FQ.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethical statement

Not applicable.

Data availability

The data will be made available upon reasonable request to the corresponding author.

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