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Combining Chinese Medicine and Hypnotherapy to Anxiety in Infertile Women Trying to Conceive

Daniel Hamedani*, Henry Hwang, Dean Jenny Yu and Sivarama Prasad Vinjamury

Department of Acupuncture, Southern California University of Health Sciences, USA

Abstract

Infertility is defined as the inability to produce offspring in a woman who has been trying for at least one year with a normal sex life, and the reproductive function of whose partner is normal. Unexplained infertility in women is when a woman has been put through all known medical tests, examining both anatomy and physiology, and no disease or deformity is found; the same tests must also be performed on the sexual partner, and be confirmed as negative. Anxiety is defined as a feeling of worry, nervousness, or unease, typically about an imminent event or something with an uncertain outcome. The health effects and subsequent treatment of women who develop anxiety from a diagnosis of infertility is examined in this literature review.

Introduction

Infertility is a life crisis affecting roughly 9% of couples worldwide [1]. It is defined as actively trying and failing to conceive for one consecutive year. The emotional upset of trying and failing to conceive is enormous. Depression, anxiety, and stress are common among couples experiencing infertility [2]. It is important for healthcare practitioners to treat anxiety in addition to promoting fertility in the infertile population.

Epidemiology

Eighty percent of pregnancies occur within six months of actively trying. Subfertility, which is trying and failing to conceive within six months, occurs in roughly one out of every five couples. Roughly half of the remaining sub-fertile women will conceive within three years. Women are slightly more likely to be infertile than men. Globally, women in Eastern Europe, North Africa, the Middle East, Oceania, and Sub-Saharan Africa experience the highest rates of infertility [3]. Data points show that 12% of American women aged 15-44 have impaired fecundity; 12% of American women have used infertility services; 6% of American women are infertile. In the United States, African Americans tend to experience the highest rates of infertility, followed closely by Hispanics [4]. The most common diagnosis is tubal dysfunction and pelvic lesions, usually associated with pelvic inflammatory disease or fibroids for women, and sperm disorders in men [5].

Etiopathogenesis

The World Health Organization defines infertility as a disease of the reproductive system classified as the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected intercourse [6]. Sperm disorders are the leading cause of infertility in general [7]. However, in women, tubal dysfunction and pelvic lesions are the most common cause of female infertility. Primary infertility is the classification of infertility if the woman was unable to ever bear a child. Secondary infertility is the classification used for infertility after the woman has already brought a pregnancy to a live birth. Tubal dysfunction can be caused by pelvic inflammatory disease, endometriosis, a ruptured appendix, pelvic adhesions from lower abdominal surgery, inflammatory disorders (e.g. tuberculosis), and history of an ectopic pregnancy [8]. Pelvic lesions are usually caused by fibroids. Chronic ovulatory dysfunction is classified as irregular or absent ovulation. It is typically associated with polycystic ovary syndrome in premenopausal women [9]. Ovarian reserve begins to decrease at age 30, and rapidly decreases after age 40. The natural aging process and ovarian lesions are cited as causes [10]. Abnormal cervical mucus is thick and does not allow the sperm to penetrate it. It is the least likely cause of infertility, and is most commonly seen as a side effect of clomiphene citrate therapy (a medication for infertility). In men, sperm quality is diminished through an inadequate quantity or poor quality of sperm, typically caused by genitourinary, endocrine, or genetic disorders; drugs; and toxins. Sperm emission may be impaired because of retrograde ejaculation into the bladder, obstruction of the vas deferens, congenital absence of the vas deferens, epididymis, or seminal vesicles. The prevalence rates of infertility are summarized in (Table 1).

Clinical Features of Infertility

Infertility is characterized by the absence of a pregnancy after one or more years of actively trying. Unexplained fertility is when the semen is normal, and the state of the fallopian tubes and ovulation are normal.

Diagnostic Criteria

Infertility is an acceptable diagnosis if one does not conceive within one year of actively trying. Unexplained infertility is a diagnosis of exclusion. It is made when both male and female factors check out

Table 1: Global Prevalence Rates of Infertility.

Cause	Prevalence
Sperm disorders	≥35% of couples
Tubal dysfunction and pelvic lesions	~30%
Ovulatory dysfunction or decreased ovarian reserve	~20%
Unidentified factors (Unexplained infertility)	~10%
Abnormal cervical mucus	≤5%

***Corresponding author:** Daniel Hamedani, Department of Acupuncture, Southern California University of Health Sciences, USA, E-mail: danielhamedani@gmail.com

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as normal. Fifty percent of couples diagnosed as having unexplained infertility will conceive within two years [11].

Treatment of Infertility

Treatment of infertility varies according to the health practitioner. It is generally recommended that treatments begin with low-technology methods and progress onwards to high-technology ones [12]. Treatment for infertility is dependent upon the diagnosis. Men with sperm disorders must correct the underlying genitourinary disorders if present, or be treated with clomiphene citrate or with in vitro fertilization and intra cytoplasmic sperm injection. Women with pelvic lesions can have the adhesion lysed, fulgurated, or ablated by laser or laparoscopy. Women with ovulatory dysfunction are given clomiphene citrate or letrozole to induce ovulation. Women with decreased ovarian reserve often have to use IVF with the use of donor oocytes. Women with abnormal cervical mucus may also use assisted reproductive techniques, but this is an unproven treatment [13]. Women with unexplained infertility undergo a process called controlled ovarian stimulation (COS). COS consists of giving clomiphene and human chorionic gonadotropin (hCG) to trigger ovulation; intrauterine insemination is administered within two days of this. If pregnancy does not occur, IVF or the use of a combination of gonadotropins and intrauterine insemination is administered. IVF facilities in the United States showed a pooled success rate of total-infants-born as 31%. Thirty-three percent of successful IVF treatments resulted in multiple births. The causes of infertility listed in (Table 2) are categories of diagnoses that can be subcategorized into disorders of any of the following systems: endocrine, genetic, genitourinary; exposure to heat, drugs and toxins.

The success rate of conventional therapies combined is about 30% [14]. The average cost per successful outcome of conventionally administered treatment is $48,424. On a per-outcome basis, the average cost for women receiving medication alone is $5,894. However, only 4.3% of women use medication alone. The majority of women using ART techniques use IVF, which averages $61,377 per successful outcome. The cost of a six-month treatment of acupuncture and herbs to treat unexplained infertility varies, but some estimates average $3,000 [15].

TCM and Infertility

Chinese medicine recognizes several causative factors relating to infertility, or Báo.

Age, constitutional weakness, mental or physical overwork, sexual activity at an early age, exposure to in climate weather, and an unhealthy or irregular diet are associated with subfertility. These concepts are based upon the excess or deficiency of Yin (structure) and Yang (function).An excess of Yin is associated with conditions such as abnormal cervical mucus, fibroids, PCOS, and endometriosis. A deficiency of Yin may be akin to pelvic adhesions or decreased ovarian reserve. A deficiency of Yang may be likened to sperm disorders or tubal dysfunction. The most common organ affected in infertility is the Kidneys. The Kidneys rule birth, growth, development, reproduction, and sexuality. Their relative impact by common Western lifestyle practices makes them a common factor of reproductive weakness.

Exposing oneself to inclement weather is the most common cause of primarily infertility in young women [16]. Pubescent girls exposed to cold and dampness while exercising, especially during the period, are vulnerable to a Cold or Damp pathogen invading the Uterus, Ren, and Chong vessels, preventing fertilization. Fertilization is also inhibited from an immoderate consumption of cold, greasy, or dairy foods and drinks that either lead to Cold in the Uterus or Dampness in the Lower Burner. Over time, Dampness in the Lower Burner can transform into Damp-Phlegm which may obstruct the Uterus, leading to a blockage of the fallopian tubes or failure of the ovum to implant upon the uterine wall.

A prerequisite for fertilization is strong Kidney function. Kidney Yin is the basis of menstrual blood, and therefore must be kept nourished. A weak Kidney Yin in a woman of childbearing age is associated with engaging in sexual activity before or during puberty. Excessive mental or physical strain also weakens the Kidney Yin. The pattern of Kidney Essence deficiency (both Yin and Yang) is associated with constitutional weakness and engaging in sexual activity at an early age. Constitutional weakness can be likened to genetic diseases. In Chinese medicine, it is generally associated with an individual's mother being old or in poor health at the time of conception. (Table 3) summarizes these etiologies and their relation to Yin, Yang, and Organ imbalances.

The foundational text of Chinese Medicine, The Yellow Emperor's Internal Classic, states that the flow of essence goes through a seven-year cycle in women, and an eight year cycle in men [17]. Theoretically, a woman is able to conceive from 14 to 49, and a man from 16 to 64. A woman is strongest at 28 years of age, and a man at 32 years of age. After a woman reaches menopause, fertility is impossible. After a man reaches an age where the motility, shape, and volume of semen are not viable, fertility is impossible. This sets up a framework that is widely known today, that it is generally recommended to conceive between the ages of 18-35.

Chinese medicine diagnosis utilizes a combination of signs and symptoms to distinguish a person's 'pattern'. The pattern can then be treated with various Chinese medicine treatment protocols. The patterns and associated clinical signs of anxiety and infertility are summarized in (Table 4).

To treat infertility, the practitioner must consider whether the pattern is one of excess, deficiency, or both. If the woman is lacking

Table 2: Infertility Treatment Options.

	Low technology	**High technology**
CAM	**Conventional**	**Conventional**
Acupuncture	Counseling	Intrauterine insemination
Herbs	Psychotherapy	Clomiphene
Yoga	Relaxation techniques	FSH
Massage	Relaxation techniques	In-vitro fertilization
Meditation		Donor Egg
Vitamins		
Relaxation techniques		
Diet		
Lifestyle		

Table 3: Infertility Etiologies and their Relation to Yin, Yang, and Organ Imbalances.

Etiology	**Yin/Yang Disharmony**	**Related Organs**
Constitutional insufficiency	Deficiency of Yin and Yang	Kidney
Mental overwork	Yin deficiency	Kidney
Physical overwork	Yang deficiency	Kidney and/or Spleen
Sexual activity before sexual maturation	Yin or Yang deficiency	Kidney, Ren, Chong
Inclement weather	Yin excess	Uterus, Ren, Chong
Excessive consumption of cold food or drink	Yin excess	Uterus

Table 4: Common TCM Patterns of Infertility and their Clinical Features.

TCM	Infertility and their Clinical Features
Kidney-Yang deficiency	Prolonged menstrual cycle, the period could be either scanty or heavy, backache, dizziness, feeling cold, depression, and frequent urination.
Kidney-Yin deficiency	Long-term infertility, periods early, scanty, with light-colored blood, five-palm heat, night sweating, dizziness, tinnitus.
Blood deficiency	Scanty periods, pale blood, delayed cycle, tiredness, depression, dizziness, pale complexion, blurred vision.
Cold in the Uterus	Primary infertility, delayed cycle, scanty period, small clots, painful period, better with heat, feeling colder during period, pale face, feeling cold, sore back
Dampness in the Lower Burner	Irregular periods, delayed cycle, mid-cycle pain, vaginal discharge, long-term infertility, adhesions, obesity, feeling of heaviness. Tongue: sticky coating. Pulse: Slippery.
Blood-Heat	Early periods (short cycle) up to twice a month, heavy flow, feeling hot during period, thirst, mental restlessness. Tongue: Red with yellow coating. Pulse: Rapid, Overflowing.
Stagnation of Qi	Irregular periods, premenstrual tension, painful periods, breast distention, irritability. Tongue: unchanged or slightly red on the sides; if stagnation of Qi arises from Blood deficiency, the sides might be Pale. Pulse: Wiry; if Qi stagnation arises from Blood deficiency, the pulse may be Choppy or Fine in general and slightly Wiry on the left.
Stasis of Blood	Irregular and painful periods, dark blood with clots, irritability, mental restlessness, abdominal pain. Tongue: Purple. Pulse: Wiry or Choppy.
Damp-Phlegm	Scanty periods, a feeling of heaviness of the lower abdomen, obesity, excessive vaginal discharge, expectoration of sputum, premenstrual breast distention, swelling and pain. Tongue: Swollen, with sticky coating. Pulse: Slippery.
Kidney-Yang	Prolonged menstrual cycle, the period could either by scanty or heavy,
Kidney-Yang deficiency with Damp-Phlegm in the Uterus	Prolonged menstrual cycle, the period could either by scanty or heavy, backache, dizziness, feeling cold, depression, frequent urination, feeling of heaviness of the lower abdomen, obesity, excessive vaginal discharge, expectoration of sputum, premenstrual breast distention, swelling, and pain. Tongue: Pale, Swollen, wet. Pulse: Deep, Weak, and slightly Slippery
Kidney-Yang deficiency with Dampness	Prolonged menstrual cycle, the period could be either scanty or heavy, backache, dizziness, feeling cold, depression, frequent urination, irregular periods, delayed cycle, mid-cycle pain, vaginal discharge, long-term infertility, adhesions, obesity, feeling of heaviness. Tongue: Pale, sticky coating. Pulse: Slippery.
Kidney-Yang deficiency with Blood stasis	Prolonged menstrual cycle, the period could either be scanty or heavy, backache, dizziness, feeling cold, depression, frequent urination, irregular and painful periods, dark blood with clots, irritability, mental restlessness, abdominal pain. Tongue: Pale or Pale-Purple. Pulse: Weak but Firm on the middle level.
Kidney-Yang deficiency with Blood stasis and Dampness	Prolonged menstrual cycle, the period could be either scanty or heavy, backache, dizziness, feeling cold, depression, frequent urination, irregular and painful periods, dark blood with clots, irritability, mental restlessness, abdominal pain, irregular periods, delayed cycle, mid-cycle pain, vaginal discharge, long-term infertility, adhesions, obesity, feeling of heaviness. Tongue: Pale or Pale-Purple, sticky coating. Pulse; Weak but Slippery or Weak but Firm at the middle level.

material basis, then Blood or Essence must be strengthened. If Phlegm is obstructing the Uterus, the pathogen must be eliminated. In almost all cases of infertility, the Uterus and the Ren and Chong Mai must be addressed. In cases of deficiency, the channels lack the necessary nourishment to produce an egg or nurture the fertilized egg. In cases of excess, pathogens obstruct proper Qi and Blood flow, or Essence transformation, thereby preventing implantation. These are differentiators for a practitioner of Chinese medicine to make, but there is work that only the individual can perform.

The presence of cervical secretion and one's basal body temperature (BBT) should be tracked. Cervical secretion is a direct manifestation of Kidney Essence, and is an indicator of fertility. Its presence indications that ovulation has just occurred. The steadiness of basal body temperature, and its sharp rise during ovulation, is an indicator of fertility. An abnormal BBT rhythm suggests that is something wrong with the cycle. If a previously flat chart starts to develop the typical biphasic sharp (Figure 1), it is an objective sign that progress is being made. Chinese medicine has an array of modalities to treat disease. Infertility is most commonly treated by combining Chinese herbal medicine, acupuncture, and diet and lifestyle changes.

Chinese herbal medicine typically combines any number of Chinese herbs to make an herbal formula. Similarly, acupuncturists may utilize any number of needles to insert into acupuncture points. The combination of the points makes it a clinically therapeutic treatment. Depending on the severity of the condition and competency of the practitioner, treatment with Chinese medicine averages about six months to one year [18-19].

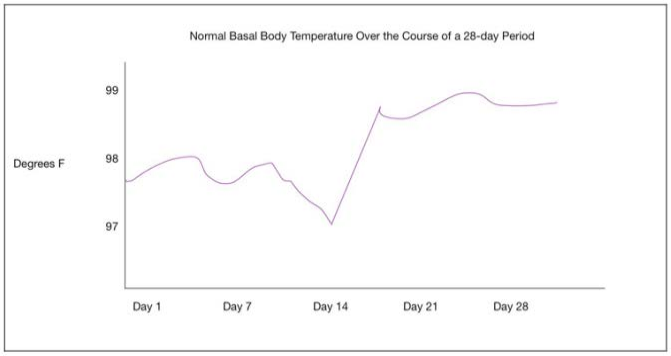

Figure 1: A Typical Biphasic Graph of BBT over the course of a 28-day Menstrual Cycle.

Anxiety and Infertility

Mental disorders are not formally recognized as a cause of infertility. Stress has several physiological consequences, including neuro degeneration and having a myriad of effects upon the endocrine system [20]. The biology of chronic stress is well documented, and is linked to the development of poor wound healing, higher incidences of infectious disease, hypertension, cardiovascular disease, depression, fibromyalgia, chronic fatigue syndrome, depression, obesity, and as some evidence suggests, infertility [21-29]. Physiological activation, also known as bodily sensations, is a cardinal symptom of anxiety, although physiological measurement is still not used for its psychiatric diagnosis [30]. Current theories regarding stress and infertility suggest that elevated glucocorticoids would disrupt and suppress endocrine signalling in the hypothalamic-pituitary-gonadal (HPG) axis [31].

Women with high levels of biomarkers of stress, such as alpha-amylase and cortisol, have shown increased time to pregnancy [32-33].

Infertility is linked to anxiety and depression. Several large scale studies quantify the number of infertile women diagnosed with anxiety or depression between 30 and 40% [34-37]. A recent study on suicidality in infertile women undergoing IVF found that 9.4% of them reported having thought or attempted suicide [38]. A recent literature review found that 25% to 60% of infertile women had psychiatric symptoms, and that their levels of depression and anxiety are significantly higher than their fertile counterparts [39]. It has also been proposed that infertile women presenting with psychiatric symptoms are experiencing side-effects of their fertility medication [40]. However, patients who experience treatment failure tend to have higher levels of anxiety and depression compared to those who have not yet begun treatment [41]. There is conflicting evidence to support whether treatment addressing stress enhances treatment outcomes [42]. One study found that even with adequate financial resources and a good prognosis, fertility treatments are most often discontinued due to psychological reasons [43-44].

There are a number of established ways to treat those anxious to conceive: cognitive behavioral therapy (CBT), relaxation techniques, yoga, meditation, expressive writing, and mindfulness have all been shown to be helpful [45-46]. The most effective protocol by means of research is Dr. Alice Domar's Mind/Body Program for Infertility. The program consists of 10 group therapy sessions, with both male and female partners attending at least three of these sessions. It consists of two sessions of CBT, where habitual negative thought patterns are addressed [47]. Individuals are trained to relax, journal, and become more mindful. Established in 1987, the program has been shown to improve well-being, marital outcomes, and patient retention. Patients tend to experience significantly lower levels of distress and have higher pregnancy rates than controls by a factor of 50% [48].

Traditional Chinese Medicine

Traditional Chinese medicine traces its roots to at least 100 BCE, when the Yellow Emperor's Internal Classic Huang Di Nei Jing was published [49]. The I Ching also contributed to the development of the practice. The I Ching presents a philosophy for humans to maintain their behavior with the alternating cycles of nature. The cosmological notions of Yin and Yang are the foundational factors. Yin is associated with cold, the moon, slowness, and matter. Yang is associated with heat, the sun, quickness, and function. The philosophies of Yin and Yang, the five elements of nature (fire, earth, metal, water, wood), and the six causes of disease (heat, cold, damp, phlegm, dryness, summer-heat) comprise the view of traditional Chinese medicine. The acupuncture meridians and their paired organ systems allow for detection of the precise location of a pathogenic factor lodged in the body. The practice of Chinese medicine has developed over two thousand years. It uses herbal medicine, acupuncture, taichi, moxibustion, and other modalities to treat almost any disease. It is generally considered to be a safe treatment, and in 2007, an estimated 3.1 million Americans received acupuncture treatment. Pertinent to this paper, studies have found acupuncture to be effective in regulating the menstrual cycle and improving fertility rates, and in treating anxiety [50].

Hypnotherapy

Clinical hypnosis is a modality commonly used by therapists to induce a state where a patient is more susceptible to suggestion. True to its foundation in psychology, it is used to incite behavioral and mental change. In the case of someone infertile and anxious to conceive, common thought patterns of self-blame, self-pity, and self-deprecation, fear and anger need to be uprooted. Commonly expressed thoughts of "I will never have a baby", "this is all my fault", or "my husband will leave me for a fertile woman" are associated with anxiety. The few studies of hypnosis to enhance fertility had significant positive effects [51]. The clinical practice of hypnosis is largely unregulated in the United States, with only three states requiring modest licensing requirements [52].

The advantage of combining traditional Chinese medicine and hypnotherapy is clear. These are two underutilized and cost-effective treatments without risks of severe side effects. The approach is truly holistic because it directly addresses both mind and body. Chinese medicine addresses the mind by way of the body, and hypnotherapy uses the mind to treat the mind. To date, there has not been a literature review on combining traditional Chinese medicine and hypnosis to treat women anxious to conceive.

Anxiety and TCM

Anxiety, or You Lu in Pin-yin, is a normal human emotion that nearly all people will experience to some degree as a normal response to stress. It becomes pathological when it begins to interfere with daily life. In TCM, anxiety is associated with the Heart and instability of the Shen (Spirit or Mind), and the Liver and instability of the Hun (Soul). The Shen is perturbed by Heat and is stabilized if Heart Qi, Blood, or Yin is deficient.

Etiology and Patterns of Anxiety in TCM

The etiologies of anxiety are numerous. Heart Qi becomes damaged and deficient by prolonged or excessive sadness, depression, or grief. Heart Blood soon follows if these emotions become even more intense or prolonged. Deficiencies may be developed over time if the Spleen fails to manufacture sufficient qi for the body's needs, or if the generating cycle is impacted from Liver Blood deficiency. Excessive amounts of sweating or consumption of coffee may damage Heart Qi in some individuals. Significant Blood loss can cause Heart Blood deficiency, especially if the haemorrhage is from the uterus, because the uterus is linked to the Heart through the Bao Mai vessel. The connection between the Heart and Kidney is one of the most foundational to the well-being of the mind and body. On a physical level, Kidney Water (Yin) keeps Heart Fire in check, preventing an inferno. Heart Fire spurs Kidney Water into action, preventing the accumulation and stagnation of fluids. On a cognitive level, the Fire of Shen emerges from a solid foundation of Kidney Essence. Essence and Shen depend on each other for lucid expression of mental consciousness. Overwork, excessive sexual activity, the natural aging process, and insufficient amounts of sleep can damage Kidney Yin, which damages Heart Yin. Heart Yin may give rise to heat, and heat disturbs the Shen. Without a foundation, Heart Fireblazes and anxiety becomes chronic. Genetics and a disturbed living situation are also causes of anxiety. A mother who experiences a severe shock during pregnancy may have transmitted her shock to it. Children have an unstable Shen, so a child who is raised in an abusive or fearful home is prone to its disturbance, and subsequently anxiety. A weak Spleen Qi or overconsumption of rich, greasy, sweet, spicy food and alcohol give rise to Phlegm-Heat, which mists the mind or blazes out of control, giving rise to anxiety. Modern Chinese medicine practitioners also recognize the devastating effects of prolonged use of anxiolytic drugs. These drugs act similarly to the TCM treatment pattern of heavy mineral substances that act to suppress the rising Yang and anchor the Shen. Their cold and bitter qualities eventually damage the Heart and Kidney Yin, weaken the

Spleen, congest the Liver, and further unsettle the Shen [53]. The TCM patterns and treatment protocols are listed in (Table 5).

A doctor with psychological training is better able to diagnose and treat a patient with a psychological disease. The psychological model necessitates the distinction of different states of consciousness. Wakefulness, sleep, drug-induced, hypnosis, and meditation are the states of consciousness well-recognized in the literature.

Hypnotherapy and its use in Treating Anxiety

Hypnosis is a therapeutic modality shrouded in suspicion from its portrayal in popular media and entertainment. In actuality, hypnosis is a state of consciousness in which one experiences extreme self-focus and attention, and minimal attention is given to external stimuli. Researchers have also been skeptical of hypnosis because of its reliance on surveys to measure results. Advances in neuroimaging have been able to show that a subject's response to suggestion are associated with corresponding changes in the brain regions related to the specific issue and suggestion [54]. The prefrontal cortex, hypothalamus, and limbic system (consisting of the anterior cingulate cortex and insula) are mainly thought to be active in anxiety states [55]. The use of hypnosis and the brain signatures of anxiety have not yet been explored, but preliminary data suggests that hypnosis for pain impacts the peripheral and central nervous systems, including the thalamus, sensory cortices, insula, anterior cingulate cortex, and prefrontal cortex [56]. In a clinical setting, a hypnotist may use relaxation and suggestions in an attempt to alter the thoughts and perceptions of a patient. The induction of someone into the state of hypnosis contains many variations. The general elements are:

- Fixation of mind: The subject is asked to focus on the hypnotist's words or ticking clock.
- Comfort: The subject is asked to get comfortable and feel good.
- Willingness: The subject is asked to be open to the process of hypnosis.
- Imagination: The subject is asked to use her imagination.

People are generally hypnotizable [57]. It is theorized that hypnosis works according to one of two models. One model suggests that all humans are already in a hypnotic state performing the social role of a hypnotized person. People's behavior is shaped by their expectations of how they should act in a given situation, and thus hypnosis is the fulfilment of the social expectations for that role. An alternating view suggests that hypnosis is a dissociative state, in which a "hidden observer" is created in the mind while hypnosis is taking place. This hidden observer can still observe his or her own self and sensations, but is dissociated from their mind and body. It is akin to someone driving to work and being only minimally aware of the process of driving because attention is focused elsewhere [58].

Unexplained infertility is often theorized to be caused by disorders of the mind. Many studies report that the reduction of anxiety in those anxious to conceive resulted in higher rates of pregnancy [59]. This is often the case when a couple struggling to conceive takes a holiday, and then spontaneously conceived while on vacation.

Stress is managed by hypnosis through the process of letting go. Being hypnotized necessitates that one relinquish control to the hypnotist, who is then allowed to offer suggestions that will imprint upon the mind. Positive suggestions made by the hypnotist to release feelings of fear, shame, and guilt around conceiving represents a therapeutic release, if only temporarily. Self-hypnosis is a teachable tool to offer a sense of control when anxious feelings resurface.

Several studies have found the use of psychological interventions to be useful in infertility and in those anxious to conceive. Hypnosis is an understudied tool that may be beneficial in easing anxiety related to infertility. Combined, Chinese medicine and hypnosis may be valuable in promoting both fertility and peace of mind to women anxious-to-conceive. The purpose of this literature review is to provide a clinically relevant portrait of their potential uses.

Methods

A comprehensive literature search was conducted in the following health science databases in the PubMed and EBSCO databases. The search terms infertility, subfertility, anxiety, hypnosis, and acupuncture were used in different combinations of strings. The articles must have been published between 2000 and 2018. Randomized controlled trials, prospective observational study, or pilot study were considered for acupuncture publications if anxiety was measured. Publications on hypnosis included case series and case-controlled studies that measured either anxiety or pregnancy rates. Languages were limited to the English language. Exclusions include studies that coupled herbal therapy with acupuncture as the primary treatment group.

Results

Nineteen articles total were included in this study. Thirteen articles were rendered relating acupuncture to infertility-induced anxiety. Six articles total were related to hypnosis and anxiety; two related to hypnosis and infertility-induced anxiety, two related to generalize anxieties in chronic illnesses, and two related to generalize anxiety.

Discussion

The following trials are being evaluated according to CIHR-IRSC

Table 5: Common TCM Patterns of Anxiety, and Acupuncture and Herbal Medicine Treatment Protocol.

Pattern	Related diagnoses	Treatment
Heart Qi deficiency	Anxiety neurosis, anaemia	Miao Xiang San.B 15, P 5, P 6. H 7, Ren14,S36, Yin tang, Du 19, Du 24. Ear: shen men, Heart, subcortex, sympathetic.
Heart and Kidney Yin deficiency	Hyperthyroidism, menopausal syndrome, post-traumatic stress disorder, anxiety neurosis, post febrile disease	Tian Wang Bu Xin Dan.B 15, B 23, K 3, Du 19, Du 24 H 7, P 6, Ren 14,Yin tang. Ear: shen men, Kidney, Heart, subcortex, sympathetic.
Heart Blood and Spleen Qi deficiency	Anxiety neurosis, thrombocytopenia, anemia	Gui Pi Tang. Sp 6, S 36, H 7, Ren 12, B 15, B 17, B 20, Yin tang, Du 19, Du 24. Ear: shen men, Spleen, Heart, subcortex, sympathetic.
Heart Qi and Yin deficiency	Neurasthenia, hyperthyroidism, cardiac arrhythmia, and sick sinus syndrome	Zhi Gan Cao Tang. B 15, H 5, H 6, H 7, P 5, P 6, Ren 14, S 36, Yin tang, Du 19, Du 24. Ear: shen men, Spleen, Heart, subcortex, sympathetic.
Heart and Gallbladder Qi disorders	Anxiety neurosis, mental disorders, postnatal deficiency depression	Ding Zhi Wan. G 39, SJ 5, B 15, P 6, Ren 14,7, H 9, Du 19, Du 24. Ear: shen men, Liver, Gallbladder, Heart, subcortex, sympathetic.
Phlegm Heat		Shi Yi Wei Wen Dan Tang. H 6, S 40, S 41, G 34, Yin tang, B 15, Liv 3, Du 19, Du 24.Ear: shen men, Spleen, Heart, subcortex, sympathetic

guidelines, excluding the need for a trial, which has already been addressed in this paper. Weaknesses in the studies will be mentioned.

Cochrane 2016 produced an RCT that showed significant improvement in both pregnancy and rates and quality of life. The RCT focused on improving fertility awareness and normalization of the menstrual cycle. The control group (lifestyle modification) were contacted by a researcher at least every two weeks to examine and encourage their participation in making the necessary lifestyle modifications. The researchers reported that their attempts to contact the participants were not always successful, as can be expected in any study. The control group acupuncture and lifestyle modifications compared to lifestyle alone may not be sufficient to measure the therapeutic efficacy of acupuncture. Acupuncture is a therapy based on ritual, which may benefit the participants through a placebo effect. The placebo effect of seeing a practitioner weekly for nine weeks will likely outweigh the benefits of not having a practitioner involved in your pregnancy journey, as was the case with the control group.

Isoyama 2012 compared acupuncture versus sham acupuncture (needles not on meridian lines) for infertility-induced anxiety. The main weakness in the study is that patients reported improvement in anxiety during treatment, but not post-treatment. The parameters for acupuncture treatment were not strict. Acupuncture was administered between four and six times, and usually weekly. Pregnancy rates were not significant between the treatment and control groups.

Smith 2011 administered acupuncture compared to a wait-list control. Smith mentioned in the Methods section that treatment group participants were taught to focus on their breath as a means of relaxing; this may account for an additional method of treating anxiety, of which acupuncture alone may not be the only modality contributing to therapeutic success. Even though randomization was performed, the BMI, years of infertility, causes of infertility, and previous use of acupuncture widely differed between the two groups.

Domar 2009 showed an improvement in anxiety levels in the treatment group, but that did not correspond to higher pregnancy rates. This study draws criticism because the control group laid quietly on a treatment table for 25 minutes before and after the IVF procedure. This may have led to the control group having increased levels of anxiety. On some occasions, nurses entered in patient rooms with acupuncture needles inserted into them, thus reducing the quality of the blinding of the study.

Johnson 2006 declared no conflicts of interest even though he was both the sole practitioner and researcher. The parameters of acupuncture were not strict. The patients chose the amount and frequency of acupuncture sessions. The treatment group (n=265) was much larger than the non-treatment group (n=26). No exclusion criteria were listed, and live birth rates were not reported. Some patients received extra sessions for headaches or endometriosis.

Qu 2014 examined auricular acupressure (AA) vs. sham-AA vs. a no-treatment control group. The researchers did not specify any conflicts of interest. The specific inclusion and exclusion criteria were not disclosed.

Kovarova 2010 examined acupuncture for self-efficacy and psychological support. The amount of women who completed the study was too small to draw a conclusion (n=13). Women already undergoing acupuncture treatment were included in the study.

Balk 2010 examined perceived stress, acupuncture, and pregnancy rates among women undergoing IVF. Randomization was not performed, and patients chose whether or not they wanted to undergo adjunctive acupuncture treatment. The number of patients in the control group was higher than the treatment group (n=40 vs n=17). The acupuncture group was older (37.5) and was more likely to have a donor embryo. The authors concluded that pregnancy rates may be enhanced, but the p-value was not significant (p=.13). This study was not blinded or placebo controlled. Conflicts of interest were not specified.

Vyas 2013 is a case series examining whether psychotherapy with the inclusion of direct and indirect hypnosis benefited women with unexplained infertility. The authors did not specify any p-values, so statistical significance cannot be declared. There was no blinding done in this study, nor was there a control group. The case series spans 28 years, and there is no mention as to the number, frequency, and duration of treatments and its result in a successful pregnancy. Couples were also given standard therapeutic measures, so success cannot be attributed to hypnosis alone.

Levitas 2006 performed a case-control study examining the effects of hypnosis on IVF/ET outcomes. Conflicts of interest were not specified. A longitudinal study to study the effect of hypnosis on implantation and pregnancy rates in the same individual may have been more appropriate than a case-control study.

Why did some treatments that only treated anxiety show an increase in pregnancy rates? Emotions are not seen as a cause of infertility in biomedicine, but TCM recognizes that certain emotions affect different organs. The Liver is the most common organ affected by stress. It is common for Liver Qi to overact on the Stomach, causing a disharmony between the two organs. The Stomach is connected to the Uterus via the Chong meridian. A disturbance in the Stomach can lead to a problem with the Uterus, and thus conception. In "Five Element" theory, the Liver is the mother of the Heart. The Heart is connected to the Uterus via the Bao Mai channel. A disturbance in the Heart can affect the Uterus, and thus conception. The emotions of worry and pensiveness are associated with the Spleen. The Spleen plays an important role in Qi movement and Blood production. Emotional taxation affects the Spleen, and can thus lead to a Spleen disharmony of Qi deficiency, Blood deficiency or stasis, or Damp-Phlegm accumulation. Both physical and mental health can therefore be treated by addressing emotions.

Emotional causes are not viewed as a cause of infertility in biomedicine. A common method of assessing emotional factors is through questionnaires. A 339 person study in the UK found that women trying to conceive self-reported symptoms of depression, anxiety, and stress that were not significantly associated with time to pregnancy [60]. A similar study conducted in the USA used α-amylase, a biomarker of stress, and found that women in the highest quartile of a-amylase levels at baseline were twice as likely to experience infertility. Another study examined 135 IVF patients, and found that cortisol levels (another biomarker of stress) were significantly correlated to pregnancy rates. These findings seem to indicate that psychological symptoms have a negative impact on fertility.

Eliminating psychological symptoms should show an increase in pregnancy rates. Four out of the five studies that treated anxious symptoms with acupuncture found that correlation. This is also true with other interventions. Alice Domar found that women with secondary infertility that underwent treatment for psychological disorders experienced a 60% pregnancy rate within 18 months compared to a control group that experienced only a 10% pregnancy rate. These interventions consisted of cognitive behavioral group therapies, and

relaxation and stress management strategies. Domar also found that psychological distress in infertile women increases with time, and that depression peaks in the second and third years of infertility. Infertility-induced distress does not return to a normal range until six years after infertility. By teaching stress-reducing methods to infertile women at the initial time of diagnosis, pregnancy rates may increase.

This is not a study on acupuncture and IVF, but according to a 2008 Meta review by the BMJ, "Current preliminary evidence suggests that acupuncture given with embryo transfer improves rates of pregnancy and live birth among women undergoing in vitro fertilisation" [61]. Khadivzadeh et al. found that women undergoing IVF/ICSI and acupressure significantly reduced both mind and body perceptions of anxiety [62].

The limitations of this study were the small body of research available on the topics. The publications on acupuncture commonly assessed anxiety characteristics according to a wide range of anxiety scales. The bulk of research on hypnosis and anxiety occurred in the 1990s, which were exclusionary criteria for this study. The abundance of studies on acupuncture, and the lack thereof hypnosis was the reason the acupuncture studies outweighed the studies on hypnosis.

Conclusion

Infertility can cause debilitating anxiety in a large percentage of women. Four out of five studies showed that traditional Chinese medicine had a positive effect on improving fertility rates. Both hypnosis and traditional Chinese medicine showed significant effects in improving anxiety rates in all studies. The combination of acupuncture and hypnosis can easily integrate into the current best practices for each modality. Both acupuncture and hypnosis treatments begin with a patient history, and then the treatment is administered. Hypnosis can be integrated into the practice of acupuncture by reciting suggestions to the patient once the acupuncture treatment has been administered.

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