

---

# Truth or False: Increasing Success Rate of IVF by Acupuncture

Xiaoji Jenny Li      B. Acu (China), M. Hs (NZ), PhD Acu (China)

## Introduction

In vitro fertilization (IVF) is a major medical intervention for infertility when other reproductive approaches have failed (Jones, 2003). This paper discusses how the success rate of IVF may be improved using acupuncture.

## In Vitro Fertilization (IVF)

There are two main methods of IVF: conventional and natural. Conventional IVF is the standard procedure that starts from ovarian hyperstimulation to induce development of multiple follicles (La Marca, 2014), and when the ovarian follicles reach maturity, an injection is performed for induction of final oocyte (Humaidan, 2011). The next step is egg retrieval under anaesthesia, followed by oocyte selection and sperm washing to optimise the chance of successful pregnancy (Choi et al., 2008). The sperm and eggs are then incubated in a culture media for actual fertilization (Teixeira et al., 2013), with the fertilized egg cultured in a growth medium for cell division. After a selection of embryos based on the number of cells, evenness of growth and degree of fragmentation, they are finally transferred back into the woman's uterus to complete the procedure (Human Fertilisation Embryology Authority, 2014a).

The natural cycle IVF consists of two sub-classifications that differ by the drug dosage used. The mild IVF uses a small dose of ovarian stimulating drugs for a short period during a woman's natural cycle (Nargund, 2009), and the drug free IVF only has three

---

basic steps of collecting and fertilizing egg during a normal ovulatory cycle, as well as egg implantation (Human Fertilisation Embryology Authority, 2014b).

### **Clinical dilemma**

Infertility now has a high, and increasing, prevalence worldwide and IVF treatment can be the last option to make a baby, and appears to promote an improvement in clinical outcomes for infertility. However, the success rate in conventional IVF is variable and not high (12.5-31.9%), with a tendency of descending success with increasing age (Anderson, 2013).

The side-effects of IVF due to the utilization of drugs and medical interventions include infection (Practice Committee of American Society for Reproductive, 2008), multiple births (Olivennes, 2001), birth defects (Hansen, 2013), ectopic pregnancy and ovarian hyperstimulation syndrome (OHSS), and can be life-threatening (La Marca & Sunkara, 2014). Psychiatric disorders such as stress is common in IVF receivers too (Volgsten et al., 2010) and is possibly linked to reproductive failure (Nakamura, 2008).

On the other hand, natural IVF with less complications and adverse events appears safer but the pregnancy rate is extremely low at a maximum of 4%, and dropping with increasing age (Human Fertilisation Embryology Authority, 2014b).

Considering sociological aspects, IVF can be a hard decision for particular populations having ethical restrictions due to religion (Medical News Today, 2006), legislation (The Associated Press, 2003), society and culture (Drah, 2012). Furthermore, the high cost is a major barrier to IVF access (S. J. Dyer, 2013).

In summary, IVF treatment is complex and consists of series of steps that, if any of the steps is applied improperly, the conception may not happen and most women will have to undergo more sessions. Due to the significant stress derived from IVF associated side-effects and complications, financial limitations and ethical influences, uncertain pregnancy and birth rate, it becomes sensible for infertile couples to seek help from complementary medicine. Acupuncture is the most common choice as it provides good physical and mental support for each step of IVF from start to end (Balk,

---

2010).

## **Acupuncture**

As a component of Traditional Chinese Medicine (TCM), acupuncture is one of the oldest healthcare methods used for over 2,500 years for wellbeing promotion and disease healing including gynaecological and obstetric disorders (Quah, 2003). Since acupuncture is the major form of complementary and alternative medicine (CAM), its use has risen significantly worldwide covering a wide range of clinical conditions, such as infertility (Dieterle, 2006).

Acupuncture involves insertion of needles into certain points on the body, to restore the balance and energy that has been lost in pathogenic conditions and illness (Westrup, 1997). The term “acupuncture” in clinical practice refers to a broad range of modalities including classic needling, laser and electro acupuncture, microsystem acupuncture, acupressure and moxibustion, according to the definition by WHO (2003).

In this article, I will use evidence based practice to critically examine the efficacy of acupuncture helping IVF.

## **Evidence Based Practice**

Evidence based practice (EBP) is an approach utilizing the current best evidence in making clinical decisions for the care of individual patients that involves integrating clinical expertise with available external evidence from systematic research (Dawes, 2005). An effective EBP involves five steps:

1. Formulating a clinical question or questions;
2. Retrieving information to answer the question;
3. Making a clinical decision by repeatedly reading and assessing the information;
4. Carrying out the decision;
5. Evaluating the whole process to determine whether optimal outcomes were achieved.

Quantitative and qualitative research are the main techniques to gain evidence for EBP. Quantitative research involves gathering absolute numeric data that can be examined objectively, and is designed to separate aspects for the whole picture to be counted statistically and to remove bias that may affect the study. Conversely, qualitative research is more subjective and focuses on conceptual data of personal experimental and emotional phenomena such as descriptions, observations, feelings, reflections, stories and judgments. It interprets the apparent data into clinical practice to explain how, what and why (Giacomini & Cook, 2000) and in which researchers are emotionally involved and may bring bias to results.

The methods for quantitative research are controlled experiments and surveys, while for qualitative research are interviews, observations and reviews with open or close-ended questionnaires (American InterContinental University, 2012).

### 1. Clinical question

Asking the right clinical question is fundamental to EBP and a well-built question should contain four factors that identify the Patient or Population, Intervention, Comparison and Outcomes (Centre For Evidence Based Medicine, 2009) (Table one).

Table one PICO

Patient or Population	The main characteristic for patients in the research. E.g. Infertile women resorting to IVF for conception
Intervention	The medical modality or management strategy. E.g. IVF with Acupuncture adjunctive therapy
Comparison	The control or alternative management to compare with the intervention. E.g. IVF alone or IVF with sham acupuncture

Outcome	The patient-relevant consequences of the intervention. E.g. The pregnancy rate in acupuncture group is significantly high ( $P=.03$ )
---------	--

My clinical questions are set to investigate whether acupuncture has any effect on IVF: Does acupuncture improve the outcomes and reduce complications? Is acupuncture appeared to be a reliable and safe option for IVF?

## 2. Literature search

A computerised database search was used to identify clinical trials for the efficacy of acupuncture assisting IVF. Medical literature was searched for published studies in an extensive range of health database including MEDLINE, CINAHL, EBSCO, Health Source: Nursing/Academic Edition, Biomedical Reference Collection: Basic, Health Source, Health Business Elite and SPORTDiscus from 1999 to March 2014.

For the quantitative studies, the search strategy covered key words and terms related to the condition and intervention, which were "Acupuncture", "IVF" and "Randomized control trial (RCT)". The abstract of each article has been screened for eligibility, and the full text was retrieved only when the title and abstract appeared to be useful.

There were 119 articles available after the first search of "acupuncture" and "IVF", which then reduced to 91 articles when the "RCT" publication type was added. 25 articles were finally viewed after assessing the abstract and publication date. The reason to limit the start year of literature search to 2001 is that the "Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICTA)" was issued in this year, and only after that the transparency and completeness in acupuncture RCTs were standardized and improved (MacPherson et al., 2002).

Qualitative searches included the following key words - "acupuncture", "IVF", "qualitative", and words for describing feelings including "experience", "expectation", "perception", "impact", "attitude", "evaluation", "resp

onse”, “reaction”, “influence” and “coping”. Table two has listed articles with respect to the key words.

Table Two

	<b>Acupuncture</b>
	<b>IVF</b>
<b>Qualitative</b>	2 articles
<b>Experience</b>	6 articles
<b>Expectation</b>	1 articles
<b>Perception</b>	2 articles
<b>Impact</b>	7 articles
<b>Attitude</b>	1 articles
<b>Evaluation</b>	8 articles
<b>Response</b>	6 articles
<b>Reaction</b>	1 articles
<b>Influence</b>	7 articles
<b>Coping</b>	2 articles

Following the paper assessment process, two quantitative articles and one qualitative article were selected for analysis.

Article one and two are both quantitative research - the first research was conducted in 2002 (Paulus) and had no supportive treatment for control. It is considered the

---

seminal study for testing effectiveness of acupuncture on IVF and the gold standard that been used in a lot more clinical trials later on (Anderson & Rosenthal, 2013). Article two (Moy et al., 2011) was chosen because it used sham needling for comparison which complements article one and represents the most commonly used methods in acupuncture RCTs. Article three (de Lacey, 2009) is qualitative research on women's perceptions to acupuncture in IVF.

### **3. Critical appraisal**

My critical appraisal for each study consists of three aspects: rigour, findings and relevance, using the Critical Appraisal Skills Programme (CASP) that helps understand the research methodology, reliability and conclusion to decide the quality of studies (Jatinder, 2013) (Appendix one and two).

#### **Article one**

***“Influence of acupuncture on the pregnancy rate in patients who undergo assisted reproduction therapy”***-- Paulus, W. E. (2002). *Fertility and Sterility*, 77(4), 721-724.

#### **Rigour**

The aim of this RCT (Paulus, 2002) is to evaluate whether acupuncture helps IVF by increasing the pregnancy rate. 160 healthy women undergoing IVF treatments with good quality of embryo (ICSI was performed only when associated with male subfertility) were allocated randomly and equally to the acupuncture and control group, with no significant difference of age, cause of fertility and gynaecological conditions at baseline.

After the same routine procedures of ovarian stimulation, follicle puncture, oocyte retrieval and cultured fertilization, patients in the treatment group received 25 minutes of acupuncture before and after the embryo transfer, with “Deqi” sensation required. “Deqi” sensations of tingling, numbness and heaviness are a common response after proper needle insertion (K. K. Hui et al., 2000) and is a prerequisite to acupuncture curative results (2007). The acupoints were chosen according to the principle of “relaxing uterus” in TCM and differed between pre and postal treatment.

---

Accompanied to the body acupuncture, auricular acupuncture was also applied on certain ear points of both sides.

The oocyte retrievals and embryo implantation in same methods were all performed by the same examiner who was not aware of patients' allocation, with no between-groups difference to the process of embryo replacement. To keep the equilibrium, patients in control group remained lying down for 25 minutes after the operation as well.

Outcome measurements were set to exam the changes of uterine arteries by pulsatility index (PI), cubital veins, plasma estrogen and  $\beta$ -HCG for pregnancy. Data were collected and then corrected by Student's *t*-test, compared by Chi-square test and finally analysed statistically by Statgraphics.

### **Findings**

Most variables including age, previous cycles, embryos, endometrium, estrogen and PI remained no difference in this study, but the pregnancy rate in acupuncture group was significantly higher than control (42.5% vs 26.3%;  $P < 0.05$ ).

### **Relevance**

This study had a good sample size and was adequate enough to average out differences between the groups, because RCTs rely on the key methodology of randomization and large samples to smooth away variations such as age, cause and nature of infertility (C. Dyer & Joseph, 2006). In addition, results of this study appeared to be reliable and consistent therefore it has met its objective. The research concluded that acupuncture does increase the clinical pregnancy rate in IVF.

### **Article two**

**"Randomized controlled trial: effects of acupuncture on pregnancy rates in women undergoing in vitro fertilization"**- Moy, I. (2011). *Fertility and Sterility*, 95(2), 583-587.

### **Rigour**

---

This was a double-blinded clinical study with 161 patients using the same treatment protocols in article one (Paulus, 2002) to test whether verum acupuncture was superior to sham acupuncture on the outcomes of IVF.

The participants were randomly allocated to classic and sham acupuncture group by a random number generator, with the blindness deliberately concealed to both practitioners and patients by careful attention to their communication. Both groups received 25 minutes acupuncture on classic body/auricular points and sham body/auricular points by licensed acupuncturists before and after the embryo transfer. Outcome assessments were consisted of  $\beta$ -HCG, clinical pregnancy, chemical pregnancy rate and a McGill Pain Questionnaire for clinical adverse events. Data were modified with Student's t-test and Chi-square, and then analyzed with SPSS.

### **Finding**

The study achieved higher success pregnancy rate in both groups, but there was no difference ( $P>.083$ ) at the baseline with age, reasons for infertility and IVF processes. Even though the pregnancy rate was higher than expected in the control group, there was no significant difference between true acupuncture and sham (45.3% VS 52.7%,  $P=.786$ ). However difference did exist in pain scales that suggested patients experienced more unpleasant complications of tiredness, fear and aches having real acupuncture. No severe adverse effects have been found.

### **Relevance**

Sham acupuncture, also considered as "placebo acupuncture", is the most commonly used control intervention for acupuncture RCTs. The sham acupuncture can be one of three types:

1. Sham needling: superficial or minimal needling on skin without the sensation of "Deqi";
2. Sham needle: the tip of the needle is blunt and does not puncture the body, yet delivers to patients a pricking sensation. The needle then moves inside the shaft and appears to be shortened (Streitberger & Kleinhenz, 1998);

- 
3. Sham points: acupoints violating the locations and indications in TCM literatures (Moffet, 2009).

Researchers have used sham body and auricular points in this trial that intended to have no therapeutic outcomes, as well as successfully blinded patients to the treatment therefore they concluded the result of higher pregnancy in sham may be caused by placebo effects or expectation to acupuncture. Moreover, bias might be created by the fixed treatment protocol and impossible blindness to practitioners who performed the acupuncture.

### **Article three**

**“Building resilience: A preliminary exploration of women's perceptions of the use of acupuncture as an adjunct to In Vitro Fertilization”**- de Lacey, S., et al. (2009). BMC Complementary & Alternative Medicine 9: 11p

### **Rigor**

The use to acupuncture is increasing worldwide in the recent two decades (Lui, 2012; Smith, 2006; Zuzak et al., 2013), however people are still not aware of the mechanism of acupuncture and know nothing about what it is and how it works. This qualitative study was designed to find out the acceptance, attitudes, expectation, experiences and evaluation towards acupuncture itself, how it is adjunctive to IVF and how it improves general well-being.

20 subjects were randomly picked from 300 women who underwent acupuncture for natural fertility enhancement and IVF, then resulted in eight interviews for the study. Even though the sample size was limited by relocation and convenience for access, demographic characteristics have still represented the main population and living conditions in Australia. Each interview lasted for approximately one hour and consisted of open and close-ended questions with respects to the start, process and outcome of having acupuncture. The interviews were conducted either at participants' own homes or by phone, digitally recorded and transcribed verbatim. Data analysis

---

was preceded by repeatedly reading and variation check-up including the aetiology of infertility, experiences of acupuncture and outcomes of pregnancy.

## **Finding**

### **1) Looking for acupuncture**

Due to the unfamiliarity to acupuncture itself and the Chinese culture it originated from, knowing about acupuncture for all the subjects relied on internet searching, recommendation of health professionals such as physician and clinic counsellors, or even from the “word of mouth” from those who had acupuncture previously.

Safety took the first priority of consideration and for being a medical intervention for external use, acupuncture appeared to have no interactions and disturbance to the ovarian stimulation therefore safer than drugs and other CAM such as herbal medicine having unknown side-effects to pregnancy.

### **2) Experiencing acupuncture**

Having acupuncture was pleasant and relaxing, and all subjects have gained more privacy by using the physical space of treatment for an emotional space to express worry, anxiety and stress. While compared to the conventional medicine, they have experienced higher quality of care by sharing more time with the acupuncturists and the holistic assessment to their mind, body and lifestyle. After the treatment for the whole body and mind, they felt the body and soul were both looked after as well as helping them to make a baby.

### **3) Outcomes**

Pregnancy rate

Six out of the eight subjects ended up pregnant after acupuncture which is 75% success rate.

Other benefits

---

The benefits of acupuncture have reflected by better mental and physical health. All the participants held a strong belief that acupuncture would help them conceive with overall rating of 9 to 10 out of 10 for their belief. In other words, it was not only the fertility being improved by acupuncture, but also the sense of calm, the ability to cope with stress and stabilization of mood. Even for the other two women who remained childless, they found positive effects in terms of their mentality and sense of well-being that made them to be more optimistic and positive, thus helped them to cope with the negative result of fertility treatments.

### **Relevance**

Stress has been shown to be one major reason for reproductive failure (Nakamura, 2008). In this study, the refreshed mind and renewed energy after acupuncture have enabled the women to objectively review their circumstances and to be more positive; the increased emotional capacity and self-control have also assisted their tolerance and to communicate with others more effectively, hence relationships were improved. Consequently, with the support from their social environment, they have changed their expectations of the treatment and saved them from grief about infertility and any negative outcome.

The nature of IVF focuses on patients' physical bodies intensively, so in some cases patients feel like their original balance has been upset during the process, and they need complementary healthcare to support them on the emotional side to maintain their balance and wellness. Acupuncture that stemmed from the conception of holism has perfectly filled this space to complete the wholeness.

It is noticeable there were only eight subjects chosen for the research, nevertheless, it has accomplished the purpose of the study with high relevance. Due to the nature of qualitative research, it investigates general hypotheses instead of specific hypotheses, and therefore it requires smaller purposeful samples rather than large sampling like quantitative research does. (Tanya Kinney & Susan, 2001). Researchers in this study have presented the phenomena of women anticipating and participating

---

in acupuncture treatments for fertility, explained and analysed the findings and completed the study by drawing the conclusion that acupuncture has the potential to improve infertile women's psychological and biological outcomes.

## **Discussion**

The two quantitative RCT researches included in my assignment both have achieved high pregnancy rate in IVF after acupuncture, with the group-difference significant in article one and not statistically significant in article two. Since they both used the same acupuncture treatment protocol, the only variation between the two RCTs is the treatment of the control group - no acupuncture or sham acupuncture. This raises a further question: does the mode of control matter in RCT and does it make any difference?

The randomized control trial is still the gold standard to examine efficacy for a therapy (Concato, 2000) because it is intended to identify each particular variable as a cause of potential difference. There is no doubt about having no treatment for the control group, but the use of sham remains debatable, and the results for sham RCTs are contradictory (Cheong, 2008). The theory is that a placebo in RCT has been defined as a procedure or substance that is objectively without specific activities for the condition being treated and does not cause placebo effects, in other words, is inert (Moerman & Jonas, 2002). In acupuncture RCTs, "sham" acupuncture is supposed to be a "mock treatment" that been controlled as a plain contrast to assess certain acupuncture techniques or for certain conditions (Langevin et al., 2011). However, unlike drug trials, sham needling or sham points both deliver certain stimulation to the body that should be considered as either real acupuncture itself, or acupressure that creates therapeutic effects (Lund & Lundeborg, 2006) thus putting the trial at risk of bias.

Another limitation of using sham acupuncture for control is the acupuncturist who performs the treatments. It is almost impossible to blind practitioners in the hands-on therapy (Han & Ho, 2011) and because of their awareness of the patient and through the doctor-patient relationship, the therapeutic outcomes can be significantly

---

affected (Bensing, 1991). The reason is that the practitioner is one key variable in acupuncture trials, and the psychological healing that the practitioner brings can be strong enough to change results (Stewart, 1995), especially for infertility that is deeply involved with emotional status and mental influences. It is therefore suggested that there is less physician participation, such as using outwardly looking identical electric acupuncture devices to have less influence delivered to the patient to avoid placebo effects (Han & Ho, 2011).

The last article of qualitative research has focused on women's responses to acupuncture on psychological side which complements the first two articles and altogether provided evidence for future research.

### **Conclusion**

Acupuncture in relation to women's reproduction has been researched vastly by clinical trials. They have revealed therapeutic mechanisms of enhancement to uterine receptivity by stimulating uterine blood flow (Stener-Victorin et al., 1996), promoting ovarian blood flow and reduction of ovarian cysts and volume (Lim & Wong, 2010), as well as helping other causes of infertility such as PCOS, without severe adverse effects (Stener-Victorin et al., 2000). Not limited to the physical outcomes, scientific evidences have also suggested acupuncture improves mental health (Paterson & Britten, 2003) by stimulating release of endogenous opioids and inhibiting stress response for women undergoing IVF (Manheimer et al., 2008).

Acupuncture is a safe and reliable solution adjunct to IVF, with pregnancy success achieved by the two arms of psychological and biological benefits (Horn, 2007; Ng, So, Gao, Wong, & Ho, 2008).