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Comparison of Traditional Chinese Medicine and Traditional Thai Medicine on Their Theories and Therapeutic Prescriptions in the Treatment of Female Infertility

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Rationale

Female infertility is defined as the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse, and is currently becoming a worldwide reproductive health concern. Although not a fatal disease, there are serious impacts on both the physical and mental health of those affected, and it has become a problem for society as a whole. According to the Center for Disease Control and Prevention, CDC, the estimated incidence of infertility is gradually increasing. The causes of female infertility are complex, and caused by a range of factors, such as abnormalities of the ovaries, uterus, fallopian tubes, the endocrine system, or there may be other unknown causes. The treatment of female infertility remains a challenge for healthcare providers.

Traditional Chinese medicine (TCM) and Thai traditional medicine (TTM) are two of the most important alternative fields of medicine available in Thailand for the diagnosis and treatment of female infertility. The field of traditional Chinese medicine especially, has developed comprehensive diagnosis and treatment options for female infertility, which have been developed over the past several hundred years.

Traditional Chinese medicine (TCM) and Thai traditional medicine (TTM) have similar but distinct treatments for female infertility; each having an advantage over the other in some respect. The objective of this research is to systematize and analyze the differences between traditional Chinese medicine (TCM) and traditional Thai medicine (TTM) on their theories and therapeutic prescriptions for the treatment of female infertility in Thai patients, and provide the theoretical basis and references for the continued learning exchange between TCM and TTM.

Research Objectives

To systematize and analyze the differences between traditional Chinese medicine (TCM) and traditional Thai medicine (TTM) on their theories and therapeutic prescriptions for the treatment of female infertility in Thai patients and provide the prescription compatibility of herbal formulas for Thai female infertility

Methodology

Document analysis

We systematized and analyzed 228 published papers and 161 textbooks on TCM and 87 published papers and 29 textbooks on TTM and herbal prescriptions for the treatment of female infertility collected between 2008 and 2018 (July), historical texts on TCM, and all data from 1782 until 2018 (July) for TTM from the Medline, Cochrane, CBM, CNKI, and the ThaiJO database by using the following search terms: 'infertility', 'female infertility', 'Chinese medicine', 'Chinese herbal medicine', 'Traditional Chinese medicine', 'TCM', 'woman disease', 'Thai Traditional medicine', 'Thai herbal medicine', and 'TTM'. Additionally, we sourced books relevant to female infertility in TCM and TTM and checked reference lists of relevant articles from the Shanghai University of TCM, and the Thai National Library.

Statistical Analysis (Data mining analysis)

Data mining and statistical analysis was used to analyze the TCM and TTM prescription patterns for treating female infertility from Tianfa Hospital, ZhengWenjie TCM Clinic from January 2014 – August 2018. Data was input into Excel 2010 and statistical analysis was performed by IBM's SPSS Statistic Base 21.0; specifically, analysis was conducted on herbal use frequency. The statistical software identified the frequency of herb types used in TCM and TTM prescriptions in the treatment of female infertility; herbs with average and above average frequency for us in prescriptions were identified as core herbs.

The Apriori algorithm (an algorithm that is used in mining frequent products sets and relevant association rules.) of the IBM SPSS Modeler Subscription statistical software was used to screen out the association rules of prescriptions: the minimum support in TCM prescriptions is 0.3, the minimum confidence was 0.9, and the minimum support refers to the probability of A and B appearing at the same time, it is a measure of the accuracy of association rules; confidence refers to the probability that when A occurs, B will probably occur, it is a measure of the importance of association rules; minimum support and confidence determined the lift degree, lift value was more than 1, the larger value of lift referred significance of core herbs in prescription.

Results

The results showed that TCM and TTM have similar explanations on the principles of getting pregnant, infertility factors, disease mechanism, and therapeutic theories for the treatment of female infertility. The analyzed treatment results show that both TCM and TTM were based on understanding the disease mechanisms and to use a holistic diagnosis pattern, followed by choosing the appropriate treatment options available. The results of TCM and TTM prescription compatibility patterns in the treatment of Thai female infertility showed TCM's most important compatible prescription herbs were "Bupleurum chinensis - Dry human placenta, Cuscuta chinensis - Morus alba - Curculigo orchoides - Epimedium brevicornum" (see table 1); TCM prescriptions to treat Thai female infertility focused on the nourishment of Qi and blood, warm and tonify kidney-Yang, regulate Chong and Ren meridians, disperse liver Qi stagnation, promote blood circulation, and remove blood stasis. "Atractylodes lancea - Angelica dahurica", "Piper sarmentosum - Piper interruptum - Zingiber officinale - Piper retrofractum - Plumbago indica" (see table 2) were the most compatible herbal found. TTM prescriptions to treat Thai infertility regulate and nourish the four(4) basic body elements, nourish blood, nourish the fire element to eliminate cold inside the body, eliminate blood stasis, and treat all other blood disorders.

Table 1: Key associations of Chinese herbal medicines prescribed for the treatment of female infertility in Thailand.

| Consequent | Antecedent | Support % | Confidence % | Lift |
|---------------------------|-----------------------|-----------|--------------|-------|
| Curculigo orchoides | Epimedium brevicornum | 0.457 | 0.953 | 1.648 |
| Cuscuta chinensis | Morus alba | 0.453 | 0.944 | 1.967 |
| Bupleurum chinensis | Cuscuta chinensis | 0.300 | 0.957 | 1.995 |
| Dry human placenta | | | | |
| Bupleurum chinensis | Morus alba | 0.309 | 0.986 | 2.054 |
| Dry human placenta | | | | |
| Dry human placenta | Morus alba | 0.363 | 0.988 | 2.059 |
| Cuscuta chinensis | | | | |
| Dry human placenta) | Morus alba | 0.323 | 0.960 | 2.001 |
| Epimedium brevicornum | | | | |
| Atractylodes macrocephala | Bupleurum chinensis | 0.305 | 0.944 | 2.241 |
| Morus alba | | | | |
| Epimedium brevicornum | Morus alba | 0.386 | 0.977 | 2.037 |
| Cuscuta chinensis | | | | |
| Bupleurum chinensis | | | | |
| Dry human placenta | Morus alba | 0.300 | 1.000 | 2.084 |
| Cuscuta chinensis | | | | |
| Bupleurum chinensis | | | | |
| Dry human placenta | Cuscuta chinensis | 0.300 | 0.971 | 2.024 |
| Morus alba | | | | |
| Dry human placenta | | | | |
| Epimedium brevicornum | Morus alba | 0.314 | 1.000 | 2.084 |
| Cuscuta chinensis | | | | |

Table 2: Results of association rules for TTM herbal used for female infertility (n=56); herb names are in Latin

| Consequent | Antecedent | Support % | Confidence % | Lift |
|---------------------|---------------------|-----------|--------------|-------|
| Piper sarmentosum | Plumbago indica | 0.282 | 0.923 | 2.378 |
| Atractylodes lancea | Angelica dahurica | 0.212 | 1.000 | 3.864 |
| Piper sarmentosum, | | | | |
| Zingiber officinale | Piper retrofractum | 0.224 | 1.000 | 1.771 |
| Piper sarmentosum, | | | | |
| Piper interruptum , | Piper retrofractum | 0.200 | 1.000 | 1.771 |
| Zingiber officinale | | | | |
| Piper sarmentosum, | | | | |
| Piper interruptum , | Piper retrofractum | 0.212 | 1.000 | 1.771 |
| Plumbago indica | | | | |
| Piper retrofractum, | | | | |
| Piper interruptum , | Zingiber officinale | 0.212 | 1.518 | 0.857 |
| Plumbago indica | | | | |

Discussion

1. Similarities and differences between TCM and TTM on their therapeutic theories for the treatment of female infertility.

The result showed TCM and TTM had the same explanation on getting pregnant; patients must have sufficient nourishment from blood, normal menstrual cycle and flow, and under appropriate sex conditions, but TCM had 2 additional explanations about kidney essence and Qi, the balance of yin and yang conditions, and TTM pointed on normal condition of the uterus. There are quite similar principles about female infertility factors that are categorized into congenital factors and the secondary factors: for congenital factors, TCM discusses the 5 abnormalities of the female reproductive system, TTM points to inherited blood disorder; TTM and TCM has common explanations on the secondary factors, for example life style and environmental factors, including bad diet, lifestyle, excessive emotions, excessive sexual activity, or inappropriate sex conditions, etc., similar to TCM which describes exogenous pathogenicity (wind, cold, dampness), TCM also points to woman's age as well as the time of year which can also be important factors. The disease mechanism: TCM mainly explains "deficiency of kidney and spleen pattern" and "stagnation pattern" that cause deficiency of Qi and blood, the imbalance of Cong and Ren meridians, the stagnation of uterus and uterus meridian etc.; in TTM it is mainly explained that the deficiency of blood, irregular menstruation, and blood stasis, blood clot, and the abnormal uterus function were the main mechanism of infertility. The treatment analyzed result showed both TCM and TTM were based on disease mechanisms and a holistic diagnosis pattern, then choose the appropriate treatment option: for the treatment theory we found that period regulation, nourishing blood, regulate and treat uterine diseases, improve the body circulation, and remove the pathological waste were the common treatments, but further treatment theory on TCM were to warm and tonify the kidney-Yang, disperse the liver Qi stagnation, eliminating phlegm and dampness, and TTM mainly regulate the 4 basic body elements, warm the fire element.

2. Similarities and differences between TCM and TTM on their prescription compatibility pattern in the treatment of Thai female infertility.

The data mining results showed 162 unique herbs were used from 223 TCM prescriptions, TCM's most frequency used in the prescription herbs were *Pseudostellaria heterophylla*, *Eucommia ulmoides*, *Epimedium brevicornum*, *Astragalus membranaceus*, *Lycium barbarum*, *Cuscuta chinensis*, *Morus alba*, *Curculigo orchoides*, *Atractylodes macrocephala*, *Glycyrrhiza uralensis*, *Bupleurum chinensis*, Dry human placenta, *Sedum sarmentosum*, *Paeonia lactiflora*; TCM's most important compatible prescription herbs were "Bupleurum chinensis - Dry human placenta, Cuscuta chinensis - Morus alba - Curculigo orchoides - Epimedium brevicornum", so the TCM treated Thai female infertility prescription compatibility rules were to nourish Qi and blood, warm and tonify kidney-Yang, regulate Chong and Ren meridians, disperse the liver Qi stagnation, promoting blood circulation and remove blood stasis; 229 herbal were used from 85 TTM prescriptions, *Piper retrofractum*, *Zingiber officinale*, *Piper nigrum*, *Plumbago indica*, *Piper interruptum*, *Piper sarmentosum*, *Myristica fragrans*, *Angelica dahurica*, *Atractylodes lancea*, *Ligusticum sinense*, *Angelica sinensis*, *Artemisia annua*, *Cuminum cyminum*, *Nigella sativa*, *Foeniculum vulgare*, *Lepidium sativum*, *Syzygium aromaticum*, *Cyperus rotundus*, *Dracaena loureiroi* , *Terminalia chebula* were the most frequently used herbs in the prescription; "Atractylodes lancea - Angelica dahurica", "Piper sarmentosum - Piper interruptum - Zingiber officinale - Piper retrofractum - Plumbago indica" were the most compatible found, so TTM prescription compatibility rules were to regulate and nourish the 4 basic body elements, nourish blood, nourish the fire element to eliminate cold inside body, eliminate blood stasis, and treat all other blood disorders .

Conclusion

- There are similarities between TCM and TTM in their diagnosis and therapeutic approaches to treat female infertility, but there were differences on the explanation of some principles.
- Traditional Chinese medicine's and Thai traditional medicine's diagnosis are based on a holistic view, and most of the Thai female infertility patients had the "cold and deficiency pattern", then main prescription pattern compatibility of regulate menstrual cycle and flow, nourishing blood, regulate and treat the uterine diseases, improve body circulation, and to remove the blood stasis might be the effective compatible prescription. But there were differences on the specific herbal used that rely on their medicinal theories. Due to the research on the treatment on female infertility in Thailand is limited, further research is still needed.

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