Chinese Medicine Network Analysis: Exploration of Core Herbs on Diseases

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Submission: January 31, 2017; Published: November 10, 2017
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Conceptual Paper

Use of Chinese herbal medicine (CHM) is common in Asian countries as a complementary even alternative treatment to western medicine. However, the complicated composition of CHM may hinder further understanding the art of CHM treatment principle. Based on the traditional Chinese medicine (TCM) theory, TCM doctors usually combine several CHMs in one prescription to achieve the better effectiveness than using single herb by strengthening the therapeutic effects or decreasing side effects. In our previous studies analyzing prescriptions used for menstrual disorders, allergic disorders and breast cancer, 5-6 kinds of CHMs were used in one prescription in average [1-7]. Since the CHMs are often chosen by combinations, it is difficult to understand the treatment principles or choose research candidates by simply ranking the CHMs with single use. This fact may contribute to high heterogeneity in choosing study candidates, whether for clinical trials or in vitro or in vivo studies.

To solve this problem, we apply network analysis to routinely collected nationwide CHM prescription database in Taiwan to explore the core CHM treatments to a specific disease. Since the database covered nearly all inhabitants in Taiwan, the results of analysis could be regarded as a sort of consensus among TCM doctors in Taiwan.

The detailed data processing protocol was described in our previous reports [8]. By applying association rule mining and social network analysis, it is possible to discover commonly used CHMs in combinations in clinical practice and further explore the core CHMs by analyzing and graphically demonstrating the combination patterns of CHMs. Since TCM doctors usually prescribe combination of CHMs for major TCM syndrome, or “zheng” in Chinese, of a disease and then the other combinations of CHMs for minor TCM syndromes if necessary. The core CHMs for a disease could be found with characteristics of one CHM is commonly used and frequently combined with other CHMs (Figure 1). Moreover, the different clusters of CHMs represented different indications of TCM syndromes. Through the demonstration of CHMs prescribed for a disease, the researchers could clearly realize the treatment principles on TCM perspectives, and further easily choose the most appropriate CHMs.

Figure 1: The CHM combination patterns for a disease (each circle in dash lines represents a cluster of CHMs with similar indications).

Currently, we try to apply the core CHMs found for urticaria and diabetic nephropathy to clinical trials and bench studies respectively. By using the results as preliminary references, we can conduct studies provide evidences adherent to clinical practice.
References


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