doi:10.1111/j.1360-0443.2006.01660.x

A database on treating drug addiction with traditional Chinese medicine

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ABSTRACT

Aims Traditional Chinese medicine (TCM) has been used to treat drug addiction for more than 160 years and valuable experiences have been accumulated with regard to patients' detoxification and rehabilitation. The aims of this project were (1) to establish a computerized, bilingual (Chinese–English) database on TCM for drug addiction; (2) to analyse the literature published in this field; and (3) to identify those Chinese herbs commonly used for drug addiction treatment. **Design** (1) Paper collection: related papers were collected through electronic databases and hand-searched materials; (2) data computerization: the Microsoft Access program and Delphi language were used as the major data management systems; (3) paper analysis: annual publications from 1989 to 2003 were classified and calculated; and (4) herbal analysis: the frequency of herbs used and herbal function categories were analysed. **Findings** (1) A special bilingual database that contained 340 works of professional literature, including 85 patent files on TCM for drug addiction, was established, in which more than 90% of the publications originated from mainland China; (2) the literature classification showed a significant increase in the number of publications on clinical and laboratory researches in this field over the past decade; (3) five functional categorizations of Chinese herbs and the 10 most frequently used Chinese herbs as well as three toxic herbs were identified from more than 200 herbs reported in 150 original research articles and 85 patent files. **Conclusions** For the first time, the published data on TCM in the treatment of drug addiction were analysed systematically by using a new database. The results are invaluable for further laboratory and clinical studies to obtain more direct evidence.

Keywords Chinese herbal therapy, database, detoxification, drug addiction, traditional Chinese medicine.

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Submitted 18 January 2006; initial review completed 26 April 2006; final version accepted 16 August 2006

INTRODUCTION

Drug abusers have a wide variety of medical and social problems, including drug overdose, AIDS, violence and other behaviour-related disorders such as family dysfunction, unemployment and legal problems [1–3]. Searching for effective and safe therapies for drug addiction is one of the most important research targets in this field. Traditional Chinese medicine (TCM) has been used in the treatment of drug addiction for more than 160 years and many valuable experiences have accumulated for patients' detoxification and rehabilitation [4,5].

In the past 15 years, an increasing number of research papers in this field have been published; however, they have been scattered in different forms across various publications and media. This has obscured the search for related study findings by computer databases and other methods. In addition, there is a language barrier for those foreigners who would like to read the papers, as the majority of them have been published in Chinese journals without a complete English translation. The establishment of a database on TCM for drug addiction will provide essential support for all professionals—including scientific researchers, medical professionals, social workers and policy planners.

The aims of this project were: (1) to establish a computerized, bilingual (Chinese–English) database on TCM for drug addiction; (2) to analyse the features of literature published in this field; and (3) to identify commonly used Chinese herbs as well as toxic herbs for drug addiction.

Although the database established in this project encompassed a comprehensive collection of literatures about TCM treatment for drug addiction, we did not attempt an in-depth study on its efficacy and side effects. This paper focused on the development of the TCM database, as well as identifying and analysing the Chinese herbs used for drug addiction treatment.

METHODS

Database establishment

There were three steps in the procedure of establishment of the database: literature collection, literature translation, data management and computerization.

Literature collection

The related papers were collected through electronic databases, including the Database of Chinese Science Journals, the Database of Chinese Biomedical Literatures (CBMdisc), China Patent Info-net, the Database of Chinese Journals of TCM, the Database of Chinese Herbs, the Database of Products of Chinese Medicine, the Database of Chinese New Medications, Cochrane Library, MEDLINE, BIOSIS, CINAHL, World Cat and Article First, etc. A search strategy was designed by integrating the following key words: Chinese medicine, Chinese herbs, herbal medicine, herbal therapy, acupuncture, drug addiction, abuse, abstinence, detoxification, withdrawal symptoms, opioid, heroin and morphine. All databases were searched from their date of commencement to June 2003. In addition, a hand search was undertaken for conference abstracts as well as Chinese and English journals from June 2003 to the latest copies available in the Chinese Medicine Library at the Hong Kong Baptist University and Guangzhou University of Chinese Medicine.

Literature translation

In addition, the titles, author (patentee) names, institutions, sources, abstracts and keywords from the published papers in Chinese and English were translated bilingually. For the English translations of traditional Chinese medical terminology, the principles of fidelity, meaning and smoothness have been followed. The book *On the Standard Nomenclature of Traditional Chinese Medicine* was used as the major reference for the English translations of most TCM terminologies [6]. The database uniquely includes translations of the hundreds of herbal names (Chinese names, Chinese pinyin, Latino names or Latino botanical names) in the published papers, while the translations of herbal names follow the standards of the *Chinese Pharmacopoeia* [7], with additional reference to the *Chinese Herbal Medicine: Materia Medica* [8]. The English name, abbreviation and Chinese pinyin names of acupuncture channels and points, including extra acupoints and scalp acupoints, use nomenclature set forth by the World Health Organization (WHO) in *A Proposed Standard International Acupuncture Nomenclature* [9].

Data management and computerization

Bilingual (Chinese and English) information, including the title, author, institution, source, key word and abstracts of collected papers, was input into the computer and the Microsoft Access program and Delphi language were selected as data management systems for the database. All names of herbs and herbal formulae reported by original researches were listed under 'Key words' following abstracts of the papers; thus, searching for herbs through this database can be carried out both conveniently and instantaneously. Some herbal pictures were also input into the database.

Data analysis

Literature analysis

The content and feature of published literature recruited in the database were analysed including: (1) the account of published literatures dependent on different categories (literature reviews, clinical researches, laboratory researches, patent files of herbal medicines, theory studies and news) and (2) the annual account of published literature from 1989 to 2002.

Herbal analysis

The various kinds of Chinese herbs reported in the literature were analysed, by which the most frequently used herbs and herbal functional categories as well as toxic herbs were identified, respectively, from the original research articles and patent files. A herbal name in the same formula reported in different literatures was counted once, while herbs in the formulae of published papers that were listed incompletely were not counted.

RESULTS

The database

A bilingual database on TCM for drug addiction was established, which contained 340 published works of professional literature. Based on an extensive search and collection, this should be the most comprehensive and up-to-date database in the field so far.

Installation of database

1 The minimum system requirements for computers were: (i) Microsoft Windows 95 or above; (ii) 1024×768 dpi screen resolution; and (iii) 30 Mb free hard disk space.

2 Installation of CDR: by following the installation command that popped up automatically on the desktop of a computer, a file named CMDA could be installed easily and instantly from the CDR to the computer. The CDR could then be run by the computer.

Function and operation

The standard functions of the database included bilingual searching, archiving and printing; it also stored pictures of the herbs used commonly for detoxification treatment. A literature search can be conducted on title, authors, institution, source, keywords and abstract in both Chinese and English. Articles can also be selected on the herbs involved. When an article is selected, both Chinese and English abstracts can be displaced, together with other bibliographic details. A special section of the database stores the pictures of the herbs used commonly in drug detoxification. The Chinese name (with English pinyin), botanical name conforming to the International Code of Botanical Nomenclature (ICBN) standard and a brief description are provided alongside the picture.

The main window of the database provides the following buttons: (1) Chinese: this provides the entry to a search window for titles of Chinese articles; (2) English: this provides the entry to a search window for titles of English articles; (3) pictures: this provides the entry to a display window for titles of herbal pictures. The search windows consist of an area on the top for entering docuterms, an area in the middle for searching for methods and an area at the bottom for searching for results.

To use the search window, docuterm input can be limited to searching for a title, author, institution, source and key word alone, or can be combined for searching for all the above items. The language for displaying results can also be chosen in either Chinese or English. All the titles of relative articles will be listed, with the total number of articles at the foot of window following the docuterm input. That done, double-clicking on an item will display the abstract of the corresponding article in a new window (abstract window).

A web-based version of the database is also available at the following website: http://www.nd.gov.hk/cgi-bin/nd/search.pl. The web-based version provides the same search functions as the desktop-based program.

Literature analysis

The results of the literature collection showed that more than 90% of the papers originating from mainland China were published in Chinese. The United States, Europe and Asian countries such as Japan and Thailand have also carried out some research related to this topic. A total of 340 published professional works of literature, including 85 patent files, could be classified into six groups: clinical research (30%), patent files (25%), review papers (15%), laboratory research (14%), news (11%) and theoretical study (5%). The literature analysis indicated an increase of publications over the past decade in this field. Figure 1 shows the number of published Chinese works of literature in the six categories counted annually from 1989, increased substantially over the past decade.

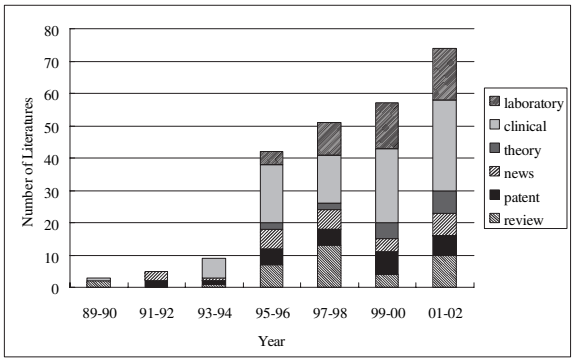

Figure 1 Annual counts of published Chinese literatures in different categories from 1989 to 2002

Herbal analysis

Commonly used herbal function categories. The results indicate that more than 200 Chinese herbs were reported in 150 original works of research literature and in 85 patent files. These herbs had a very broad functional spectrum and can be classified into 23 function categories according to the classification system of Chinese herbal medicine. The top five function categories were (1) tonifying herbs; (2) herbs for promoting blood circulation and removing blood stasis; (3) herbs for clearing away heat; (4) herbs for tranquillizing the mind; and (5) herbs for the superficies syndrome—a syndrome usually seen in the primary stage of diseases, which is manifested as chilliness, fever, headache, stuffy nose, cough, etc.

Commonly used herbs. In 150 original works of research literature and 85 works of patent literature, the top 10 kinds of most frequently used herbs included: (1) *Radix Glycyrrhizae (Gancao)*, (2) *Poria (Fuling)*, (3) *Rhizoma Corydalis (Yanhusuo)*, (4) *Radix Angelicae Sinensis (Danggui)*, (5) *Radix Ginseng (Renshen)*, (6) *Radix Astragali (Huangqi)*, (7) *Rhizoma Atractylodis Macrocephalae (Baizhu)*, (8) *Semen Ziziphi Spinosae (Suanzaoren)*, (9) *Radix Polygalae (Yuanzhi)* and (10) *Flos Daturae (Yangjinhua)* [Fig. 2(1)].

Commonly used toxic herbs. According to the *Handbook on Toxicological Aspect of Chinese Medicine* [10], in which 31 herbs were listed as toxic herbs, 13 were found in the 63

(1) The top 10 most commonly-used herbs:

1. *Radix Glycyrrhizae (Gancao)*

2. *Poria (Fuling)*

3. *Rhizoma Corydalis (Yanhusuo)*

4. *Radix Angelicae Sinensis (Danggui)*

5. *Radix Ginseng (Renshen)*

6. *Radix Astragali (Huangqi)*

Figure 2 Pictures of commonly used herbs (1) and toxic herbs (2)

original research literatures and patent files collected by this database. They are: (1) *Radix Sophorae Tonkinensis (Shandougen)*, (2) *Radix Aconiti (Chuanwu)*, (3) *Radix Aconiti Kusnezoffii (Zhicaowu)*, (4) *Radix Aconiti Lateralis Preparata (Shufuzi)*, (5) *Semen Hyoscyami (Tianxianzi)*, (6) *Rhizoma Arisaematis (Tiannanxing)*, (7) *Rhizoma Pinelliae (Banxia)*, (8) *Radix Kansui (Gansui)*, (9) *Rhizoma Typhonii (Baifuzhi)*, (10) *Cinnabaris (Zhusha)*, (11) *Flos Daturae (Yangjinhua)*, (12) *Realgar (Xionghuang)* and (13) *Venenum Bufonis (Chansu)*. The top three toxic herbs which were frequently used and reported were (1) *Radix Aconiti Lateralis Preparata (Fuzi)* (2) *Flos Daturae (Yangjinhua)* and (3) *Rhizoma Pinelliae (Banxia)* [Fig. 2(2)].

7. *Rhizoma Atractylodis Macrocephalae (Baizhu)*

8. *Semen Ziziphi Spinosae (Suanzaoren)*

9 *Radix Polygalae (Yuanzhi)*

10. *Flos Daturae (Yangjinhua)*

(2) The top three most commonly-used toxic herbs:

1. *Radix Aconiti Lateralis Preparata (Fuzi)*

2. *Flos Daturae (Yangjinhua)*

3. *Rhizoma Pinelliae (Banxia)*

Figure 2 *Cont.*

DISCUSSION

Based on an extensive search and collection, a most comprehensive and updated bilingual database on TCM treatment for drug addiction has been established. The results of the literature categorization and classification show a significant increase in the number of publications on clinical and laboratory research in recent years. This reflects the fact that clinical application and experimental research into TCM in drug detoxification and rehabilitation has gained in popularity and the quality of research data has also gradually improved.

In order to carry out a systematic search of related literatures in this project, we have screened various Chinese databases via our well-designed search strategy. A total of 141 and 99 non-overlapping related pieces of

literature were found in the Database of Chinese Science Journals and the Database of Chinese Biomedical Literatures (CBMdisc), respectively. These results indicate that large-scale integrated databases could provide only part of the related literatures, of which the data proportion was below 50% of our total collections. Some scholars have pointed out that multi-disciplinary databases such as MEDLINE could only provide approximately two-fifths of the literature in a specific domain; and 'grey literatures', such as conference theses, degree theses, patent files and drug development research reports, are far too difficult to be accessed through general databases [11]. Therefore, this showed that our computerized, bilingual (Chinese–English) database on TCM for drug addiction is so far non-replaceable in terms of its professional application value. In order to maximize the utility of this database, we suggest updating it every 6 months in order to keep pace with the publications in this study field.

As the software of the database is simple, and the requirements of the hardware and operating system are minimal, it is suitable to be installed and run in most computers that are currently used. Meanwhile, the database can implement all basic functions by means of a simple procedure and its handling should be convenient for all users. However, on-line and full-text searches for published papers are both currently unavailable in the present database. In a future modification of this database, not only its content (inclusive papers and other data) but also its software should be updated and a new web version will be developed. For example, three-tier web application architecture [12] may be employed in our database that could serve as a flexible and effective platform to search and analyse relative data by linking up with other professional databases.

Most of the papers collected from mainland China are published in the Chinese language, although some came with an English abstract. Translation from Chinese into English is an important step during the construction of this database. The principles and standards mentioned above in 'Literature translation' have been followed. For those papers with an English abstract, the English language of the abstracts was improved based upon the standards we used to ensure the consistency of terminologies. For the papers published originally in the English language, or other languages with an English abstract, translation from English to Chinese was completed by following similar principles and standards. Some minor changes have been made to those English abstracts to ensure the consistency of terminologies. In recent years, Chinese journals requiring peers' reviews have increasingly published the papers with an English abstract. Some papers have even been published in an English–Chinese bilingual form. However, due to the inconsistency in the use of terminologies by different journals, the same translation principles and standards should be followed when collecting new papers into the database in order to update it.

Almost all published data from mainland China, as well as other countries, claimed that TCM, including Chinese herbal therapy (CHT), acupuncture therapy and *Qi-gong* therapy, might be potential means for the treatment of drug addiction. CHT was the most commonly used therapy for drug detoxification in the published literature collected by our database. Based on data analysis in this study, the five function categories of Chinese herbs and the 10 Chinese herbs were identified as the most commonly used herbal medicine for drug detoxification. It will be valuable to perform further pharmacological experiments and clinical trials on the efficacy of these herbs for obtaining direct evidences.

According to TCM theories, many clinical manifestations of drug addicts are similar to the deficiency syndrome, a syndrome produced by a deficiency of vital energy and essence, lowered resistance and hypofunction of the body, seen commonly in individuals with general debility and who are suffering from a long-standing illness, manifested as a lustreless complexion, listlessness, shortness of breath, weak voice, palpitation, insomnia, poor appetite and so forth. Our analysis indicated that tonifying herbs were at the top of the five frequently used herbs in the functional categorization; and in the 10 most-frequently used herbs, Radix Glycyrrhizae (Gancao), Radix Angelicae Sinensis (Danggui), Radix Ginseng (Renshen), Radix Astragali (Huangqi) and Rhizoma Atractylodis Macrocephalae (Baizhu) are typical tonifying herbs. These findings matched with the understandings and therapeutic principles of TCM theories. Analysis of herbal safety in the treatment of drug addiction indicates that over half of the herbal formulae reported in the original research papers contained toxic herbs and that there were 13 of the 31 kinds of top toxic herbs that were listed in the guidelines for the toxicity of Chinese herbs [10] used in the original research papers. These toxic herbs may have a therapeutic effect for drug addiction; however, they should be applied cautiously as the safety of many herbal formulae, including patent preparations, is still unclear.

Patent files are an important resource for our herbal analysis, but it is difficult to verify the veracity of the patent herbal formulae collected in the study. This is because herbal formulae are modified easily by changing their herbal compositions or ratios, and because actual protection for patent herbal formulae is currently very limited. For this reason, it is understandable that some patentees list the herbal composition of prescriptions partly in their patent, which may cause a bias in our analysis. However, our preliminary analysis has at least

summarized some valuable messages from patent files on herbal prescriptions and special herbs to treat drug additions.

In addition to CHT, other TCM therapies, such as acupuncture and *Qi-gong,* may also be potential ways for drug addicts to achieve detoxification [13–16]. Acupuncture therapy, including body acupuncture and ear acupuncture, has some merits as an effective, safe, easy and economical means of clinical treatment. Some clinical trials indicate that the potential of acupuncture to treat heroin dependence and experimental studies has proved that acupuncture could improve biosynthesis, expression and the release of endogenous opiate peptides in the body, which may be a main mechanism for acupuncture to treat opioid withdrawal syndromes. Nevertheless, a systematic analysis for optimal acupoints and stimulating parameters is still insufficient in this aspect.

In summary, the published works of literature on TCM treatment for drug addiction have been captured and analysed for the first time by means of a new database that may help policy makers, clinical doctors and researchers to obtain the knowledge accumulated and the latest information in the field. Such information may be of profound importance in formulating an evidence-based policy on TCM for the treatment of drug addiction. Further clinical and laboratory studies that focus on the herbs identified by a preliminary analysis of this project may offer more valuable evidence of TCM for drug addiction.

Acknowledgements

This project was supported by the Beat Drugs Fund, established by the Hong Kong Government to fight drug abuse. The authors acknowledge the assistance of Professor Zhao Zhongzhen at Hong Kong Baptist University in providing herbal pictures captured from his book, *An Illustrated Chinese Materia Medica in Hong Kong*, sponsored by Eu Yan Seng (Hong Kong) Limited.

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