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REVIEW

Classification of interventions in Traditional Chinese Medicine

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Abstract

OBJECTIVE: To describe the key systems used for Traditional Chinese Medicine (TCM) classification.

METHODS: The TCM classifications used in the International Classification of Diseases-9 Clinical Modification (ICD-9-CM) volume 3, the ICD-10 Procedure Coding System, the International Classification of Health Interventions, and the Medical Subject Headings (MeSH) and Chinese Traditional Medicine and Materia Medica Subject Headings (TCMeSH) thesauruses were compared regarding descriptive terms, structure, and features of TCM interventions.

RESULTS: The National Library of Medicine's MeSH thesaurus is ubiquitous. The ICD-9-CM (volume 3), ICD-10 Procedure Coding System, and International Classification of Health Interventions cover insufficient concepts of TCM, and cannot be used directly as classification systems for TCM interventions. In contrast, the TCM contents of the TCMeSH thesaurus are complete, systematic, and detailed, and its hierarchical structure can be used for effective TCM classification.

CONCLUSION: TCM classification is very limited and flawed. The MeSH thesaurus helps decrease the detrimental effect of the language barrier. Similarly, the TCMeSH thesaurus can help those without full command of the Mandarin language to access Chinese literature, but the value of searches using TCMeSH could be improved by collaborative working with Information Specialists who are fluent in Mandarin and understand TCM.

Keywords: Classification; Intervention; Medicine, Chinese Traditional; Medical subject headings

INTRODUCTION

Systematic healthcare reviews, often involving Meta-analyses, are a major source of evidence required when compiling guidelines or policies. The production and maintenance of such evidence necessitates the effective identification of relevant studies. This identification of studies can be greatly enhanced by good classification systems. Classification systems are especially important when reviewing interventions, as there are such large numbers of intervention types. Classification systems can potentially reduce confusion regarding terms, bring order to a complex interrelated group of treatments, and enable effective identification of the same, similar, or related interventions.

Since the 1970s, international health and medical communities have worked to classify medical terms regarding interventions. The medical subject headings (MeSH) thesaurus of the National Library of America (NLM) is a large, generic, medical classification system.[1,2] MeSH terms are employed within PubMed, which is a large general medical database. The MeSH thesaurus is highly structured, and serves the whole medical community; however, there are limitations to

the level of detail to which specific parameters are classified. Hence, each medical subspecialty, although served by the MeSH thesaurus, is not necessarily fulfilled by it. The inclusion of new indexing within MeSH is a dynamic process, but not necessarily a rapid one. Specialist databases outside of PubMed tend to evolve their own controlled languages, which add further levels of classification to their highly specific subject areas. These controlled languages serve the same purposes as the original NLM MeSH classification, but service a more specialist user group.

Swift accurate identification of relevant work is essential for those undertaking systematic reviews. However, the sophistication of classifications varies. The present study explores this variation in the classification of interventions within Traditional Chinese Medicine (TCM). TCM has been in clinical use for more than 3000 years, and has accumulated a large number of interventions based on Chinese traditional culture and unique medical theory. A system of classification for interventions in TCM is necessary to meet the increasing demand for international communication, as well as for its own internal development.

METHODS

We collected and screened information on TCM intervention classifications from the libraries in Shanghai University of TCM and the University of Nottingham. Our pilot studies on this subject suggested that the main classifications were developed and distributed by large medical health organizations and institutes, such as the World Health Organization (WHO), the NLM, and the China Academy of Chinese Medical Sciences; therefore, we retrieved the latest progress news and documents from the relevant websites for these organizations. We used the term 'acupuncture' as a search word, and listed and compared all results returned by the classifications or thesauruses to evaluate the TCM terms and structure included in each system.

RESULTS

Medical subject headings

The MeSH thesaurus is a comprehensive controlled vocabulary thesaurus that was created by the US NLM in 1954. The MeSH thesaurus is currently the most widely accepted tool for indexing, cataloguing, and searching for biomedical and health-related information and documents. It consists of sets of terms naming descriptors, subheadings, entry terms, and Supplementary Concept Records. From its inception, the MeSH thesaurus was designed to be a dynamic list, with procedures in place for recommending and examining the need for new headings. There are 27 883 descriptors in the latest 2016 version, with over 87 000 entry terms to assist in identification of the most appropriate MeSH term. All MeSH descriptors are arranged in a hierarchical or 'tree' structure. The roots of the tree are 16 very broad concepts such as 'Diseases [C]' or 'Phenomena and Processes [G]', with more specific headings branching off into 13 subheadings.

As early as 1967, the TCM term 'moxibustion' was introduced into the MeSH thesaurus as 'the burning of a small, thimble-sized, smoldering plug of dried leaves on the skin at an acupoint, usually the plugs contain leaves of Mugwort or moxa', and subsequently TCM was accepted as a type of medical system catalogued under 'Medicine, East Asian Traditional' in 1984.[3] Most TCM descriptors are listed in the 'complementary medicine therapy', 'culture', and 'drug' categories. The TCM descriptors fall into broad general terms such as '*Yin Yang*' and '*Qi*', therapy terms such as 'acupuncture', 'moxibustion', and 'massage', terms relevant to Chinese Materia Medica such as 'Drugs, Chinese Herbal', and then many Supplementary Concept Records of chemical compositions of herbs or TCM prescriptions. TCM interventions are mainly listed in the branch of 'Analytical, Diagnostic and Therapeutic Techniques and Equipment [E]- Therapeutics [E02]- Complementary Therapies [E02. 190]'. There are 10 items comprising interventions related to acupuncture and moxibustion in the MeSH thesaurus.[4]

Within the MeSH thesaurus, the classification of TCM is more detailed and systematic compared with other traditional medicines, but the coverage of all relevant TCM interventions is still far from comprehensive. Furthermore, some hierarchical relationships within the MeSH thesaurus are problematic. For example, 'Moxibustion [E02.190.044.588]' is currently a subordinate concept of 'Acupuncture Therapy [E02. 190.044]', but in reality they are parallel concepts in both theory and practice (Figure 1).

International classification of diseases (ICD)-9-clinical modification (volume 3), ICD-10-procedure coding system, and international classification of health interventions[5]

The International Statistical Classification of Diseases and Related Health Problems, usually referred to as ICD, was originally designed in 1949 (ICD-6) as a healthcare classification system that aimed to provide a system of diagnostic codes for classifying diseases. The ICD is maintained and published by the WHO, and is used worldwide to promote international comparability in health services data collection, processing, classification, and presentation. The ICD is revised periodically, and its ninth revision (ICD-9) was developed in 1975.

The US National Center for Health Statistics created the ICD-9 Clinical Modification (ICD-9-CM), which is an adaption used for assigning diagnostic and procedure codes in the U.S.[6] The ICD-9-CM consists of

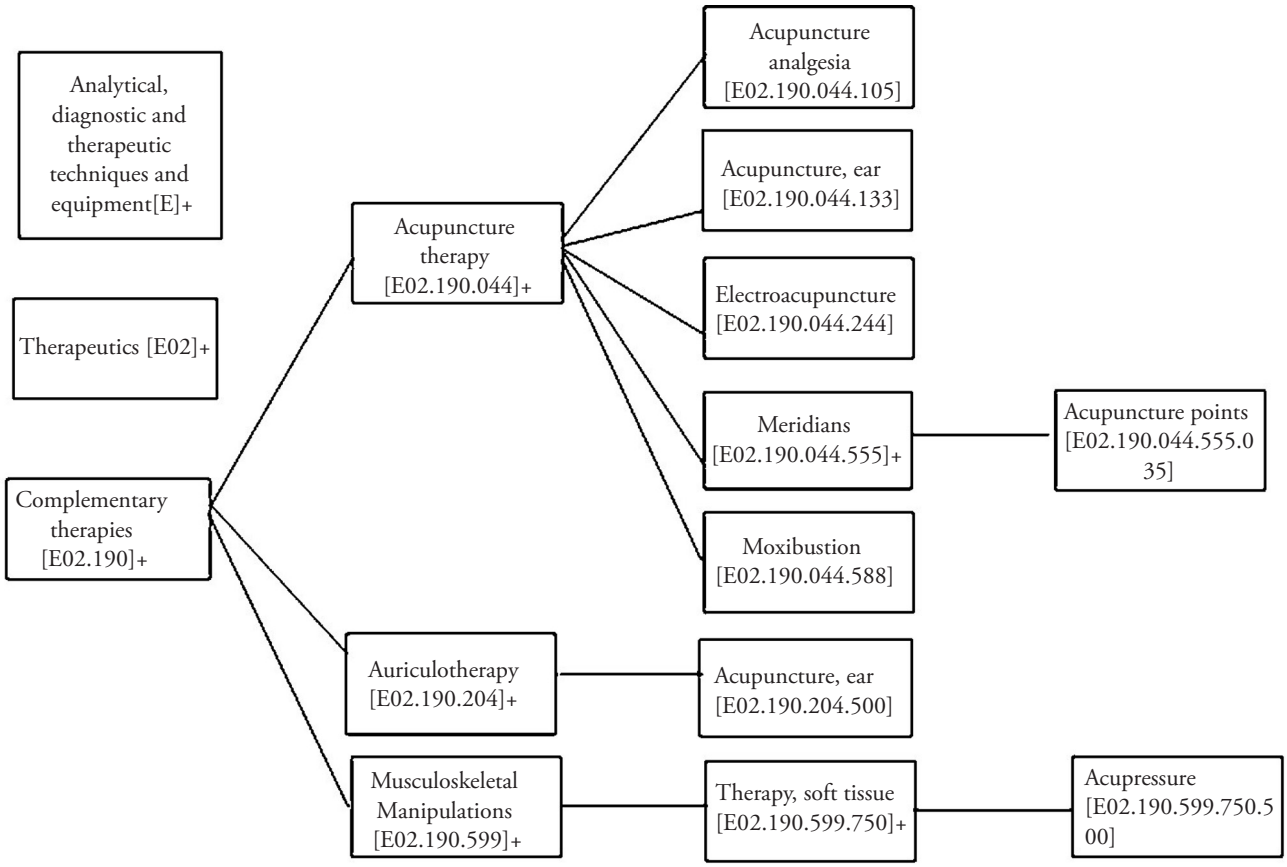

Figure 1 Structure of acupuncture and moxibustion interventions in the Medical Subject Headings (MeSH) thesaurus

three volumes; volumes 1 and 2 contain diagnosis codes, while volume 3 contains a classification system for surgical, diagnostic, and therapeutic procedures (with an alphabetical index and a tabular list). The tabular list of procedures includes a limited number of procedures and interventions related to TCM. We searched the table with the keyword 'acupuncture', which retrieved only the following three items:

Acupuncture with smoldering moxa (in 93.35 Other heat therapy)

99.91 Acupuncture for anesthesia (in 99.9 Other miscellaneous procedures)

99.92 Other acupuncture (in 99.9 Other miscellaneous procedures)

The ICD-9-CM has been used in the US since 1979, and the structure of volume 3 of the ICD-9-CM has not allowed the effective incorporation of new procedures associated with rapidly changing technology as new codes. As a result, in 1992 the US Centers for Medicare and Medicaid Services funded a project to design a replacement for volume 3 of the ICD-9-CM.

The new system is the ICD-10 Procedure Coding System (ICD-10-PCS) (Table 1). The ICD-10-PCS was initially released in 1998, and has been updated annually since then. The ICD-10-PCS has a multi-axial, seven-character, alphanumeric code structure that provides a unique code for all substantially different procedures and interventions, and allows new procedures to be easily incorporated as new codes. For example, 'acupuncture' is coded as '8E0H30Z'.

The ICD-10-PCS system also has few contents concerning TCM. We searched the codes for the term 'acupuncture', which retrieved only the following two results:

Table 1 International classification of diseases-10 procedure code

Code	Designation	Label
8	Section	Other procedures
E	Body system	Physiological systems and anatomical regions
0	Root operation	Other procedures Methodologies which attempt to remediate or cure a disorder or disease
H	Body region	Integumentary system and breast
3	Approach	Percutaneous
0	Method	Acupuncture
Z	Qualifier	No qualifier

Procedure Code 8E0H300 Acupuncture using Anesthesia

Procedure Code 8E0H30Z Acupuncture

When the ICD-9 was published by the WHO, the International Classification of Procedures in Medicine (ICPM) was also developed. Many countries have adapted and translated the ICPM, and have been using it with amendments since then, but the ICPM has never received the same international acceptance as the ICD-9. Due to difficulties in the consultation processes, international development of the ICPM was effectively stopped in 1989. As a replacement for the ICPM, the WHO designed the International Classification of Health Interventions (ICHI). The initial basis of the ICHI (alpha version) was largely derived from the Australian Classification of Health Interventions, a portion of the ICD-10 Australian Modification, which in turn was largely derived from the ICD-10 and the US extension of the ICD-9-CM. The ICHI was built around three axes: target, action, and means; and the coding scheme comprise a seven-character structure for these three axes. There is only an action of 'DA' for 'acupuncture' in the ICHI. Examples of ICHI Medical Interventions:

FMG DA ZZ (Acupuncture for movement functions)
ICHI Target: FMG (Movement functions)
ICHI Action: DA (Acupuncture)
ICHI Means: ZZ (Intervention using other method, without approach or not otherwise specified)

Chinese Traditional Medicine and Materia Medica Subject Headings (TCMeSH)

TCMeSH thesaurus is China's first specialized controlled vocabulary of TCM. Since 1987, the TCMeSH thesaurus has been published and revised continually by the Institute of Information on TCM, China Academy of Chinese Medical Sciences. This vocabulary was developed specifically to enable indexing, cataloguing, and searching for TCM interventions. The third version of the TCMeSH thesaurus contains a total of 13 905 items, including 8307 headings and 5598 entry terms.[7] Each heading has a definition, code, English translation, annotation (labelling, history, searching), and entry terms. The latest online fourth version has been available since December 2015.[8]

The TCMeSH thesaurus is designed to cover all TCM terms, and arranges these terms into a 15 root-and-tree structure reflecting traditional TCM theory and practices (Figure 2). Most TCM interventions are listed in the TCM Diagnostic and Therapeutic Techniques and Equipment [TE]- Therapeutics [TE02] branch. More than 250 TCM interventions are catalogued into a seven-level classification system.

The TCMeSH thesaurus has a tree structure similar to that of the MeSH thesaurus, and the two systems are highly compatible, facilitating the insertion of TCMeSH terms into the MeSH thesaurus for collaborative work. There is already a linking system, named Chinese MeSH (CMeSH), which includes a Chinese translation of the MeSH thesaurus that also incorporates the TCMeSH thesaurus. The CMeSH thesaurus was developed by the Institute of Medical Information, Chinese Academy of Medical Sciences, and supports the indexing and searching of some of the very large Chinese biomedical databases, such as SinoMed[9] and the Traditional Chinese Medical Literature Analysis and Retrieval System.[10] However, the CMeSH thesaurus is not included in the Chinese Medical Current Contents, China National Knowledge Infrastructure-Database, China Science and Technology Journal Database, and Wanfang Database, which are also important sources of Chinese literature (Table 2).[11]

In addition to the classifications and thesauruses discussed above, there are some common systems related to the classification of TCM interventions, such as the Chinese Thesaurus,[12] Chinese Library Classification,[13] and NLM Classification.[14] However, none of these systems include enough terms and categories to cover all TCM interventions, and none show features in line with TCM characteristics, just like the ICD-9-CM (volume 3), ICD-10-PCS, ICHI, and MeSH do.

There are also many procedure and intervention classifications developed by individual countries, such as the Office of Population Censuses and Surveys Classification of Interventions and Procedures version 4, the Nursing Interventions Classification, and the Systematized Nomenclature of Medicine Clinical Terms. But none of these classifications even cover basic TCM concepts, and cannot be used directly as classification of interventions in TCM.

CONCLUSIONS

TCM classification is currently very limited, and flawed. Reviews of TCM outcomes that do not include searches of Chinese databases will be incomplete. Using a database that employs the detail and power of the TCMeSH thesaurus may be useful to compile core literature. These records could then be studied to create a free text search of the highest possible specificity/sensitivity for use in databases that employ less refined or no controlled language for TCM. A good understanding of the English language is not a prerequisite for those searching PubMed, as the MeSH thesaurus helps to bridge the language barrier. The TCMeSH thesaurus should help those who are not fluent in Mandarin to access Chinese literature, but the value of searches using TCMeSH would likely be improved by collaborative working with Information Specialists who are fluent in Mandarin and understand TCM.

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Therapeutics+ TE02
...(6 other items)
Traditional Chinese Medicine Therapy+ TE02.035
Therapeutic Methods+ TE02.035.005
...(32 other items)
Acupuncture Moxibustion Therapy+ TE02.035.005.150
Moxibustion+ TE02.035.005.150.005
Moxa Stick Moxibustion Therapy
Moxa Cone Moxibustion Therapy
Health Preserving Moxibustion
Burning Rush Moxibustion Therapy
Electric Moxibustion Therapy
Governor Channel Moxibustion Therapy
Apparatus Aided Moxibustion Therapy
Indirect Moxibustion Therapy
Thunderbolt Moxibustion Therapy
Reverse Acupuncture and Moxibustion
Taiyi Moxa Cigar Therapy
Moxibustion with Moxibustioner
Needle Warming Therapy
Suspended Moxibustion Therapy
Medicinal Moxibustion Therapy
Direct Moxibustion Therapy
Zhuang Thread Moxibustion Therapy
Acupoint Therapy+ TE02.035.005.150.020
Magneto Therapy+ TE02.035.005.150.020.005
Magnetic Bead Therapy
Meridian Magnetic Field Therapy
Acupoint Pressure Therapy
Auricular Plaster Therapy+ TE02.035.005.150.020.015
Auricular Point Sticking, Semen Vaccariae
Acupoint Poking Therapy
Acupoint Ligation Therapy
Acupoint Iontophoresis Therapy
Catgut Embedment in Acupoint Therapy
Acupoint Sticking Therapy
Acupuncture Therapy+ TE02.035.005.150.025
Stone Needling
Ultrasound Acupuncture
Needling Methods
Spoon Needle Therapy
Electric Stimulation Therapy
Electroacupuncture Therapy
Bloodletting Therapy
Bee Needling Therapy
Fire Needle Therapy
Laser Acupuncture Therapy
Big Needle Therapy
Cutaneous Needle Therapy
Hydro Acupuncture Therapy
Specific Region Acupuncture+ TE02.035.005.150.025.070
Nose Acupuncture Therapy
Lip Acupuncture Therapy
Auricular Acupuncture Therapy
Dorsimesal Acupuncture Therapy
Face Acupuncture Therapy
Tongue Acupuncture Therapy
Hand Foot Acupuncture Therapy
Scalp Acupuncture Therapy
Eye Acupuncture Therapy
Specific Tissue Acupuncture+ TE02.035.005.150.025.075
Lymph Node Pricking Therapy
Periosteal Acupuncture
Transcutaneous Electric Nerve Stimulation Therapy
Nerve Trunk Stimulation Therapy
Body Acupuncture
Microwave Acupuncture Therapy
Acupuncture Sensation
Acupuncture Analgesia

Figure 2 Structure of the acupuncture and moxibustion interventions in the TCMeSH

Table 2 Main classification systems of Traditional Chinese Medicine interventions

System name	Creator	Type	Feature	"Acupuncture" item	Note
MeSH	NLM (US)	Thesaurus	Tree structure	10 items in 3 levels	Most widely accepted in biomedical information and documents.
ICD-9-CM-3	WHO and NCHS	Classification	Alphabetic index and tabular list	3 items	Classification system for surgical, diagnostic and therapeutic procedures
ICD-10-PCS	WHO	Classification	Multi-axial seven character alphanumeric code structure	2 codes	Provides a unique code for all substantially different procedures and interventions
ICHI	WHO	Classification	Three axes and the coding scheme comprises a seven-character structure	One action of 'da' for 'acupuncture'	Classification and coding system of procedures in medicine
TCMeSH	CACMS	Thesaurus	Tree structure	64 items in 4 levels	Developed specifically for indexing, cataloguing, and searching for tcm

Notes: MeSH: Medical Subject Headings; ICD-9-CM-3: International Classification of Diseases-9 Clinical Modification volume 3; ICD-10-PCS: ICD-10 Procedure Coding System; ICHI: International Classification of Health Interventions; TCMeSH: Chinese Traditional Medicine and Materia Medica Subject Headings; NCHS: US National Center for Health Statistics; WHO: World Health Organization; CACMS: Chinese Academy of Chinese Medical Sciences.

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