FEATURE ARTICLE

Traditional East Asian Medicine: How to Understand and Approach Diagnostic Findings and Patterns in A Modern Scientific Framework?

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ABSTRACT Research into the diagnostic methods and patterns of traditional East Asian medical (TEAM) systems of practice such as acupuncture and herbal medicine face certain challenges due to the nature of thinking in TEAM and the subjective basis of judgments made in practice. The TEAM-based diagnosis can take into account various findings and signs such as the appearance of the tongue, palpable qualities of the radial pulses, palpable qualities and findings on the abdomen, the complexion of the patient and so on. Both diagnostic findings and the patterns of diagnosis cannot be assumed to have objective bases or to be causally related to the complaints of the patient. However, the diagnoses of TEAM based acupuncture and herbal medicine have tended to look at pictures of the whole patient and rather than focus on a particular symptom, they have looked across a myriad of signs and symptoms to decide or identify the 'pattern' of diagnosis according to the theory in question. Although open for selective and subjective biases each diagnosis pattern always comes with a prescribed treatment tailored to the pattern. Further, the same research requirements needed for the validation of the diagnoses are needed also for these clinical observations and judgments. Hence, it is necessary, albeit challenging for research on TEAM diagnoses to first address these issues before proceeding to more complex investigations such as the development of instruments for making diagnostic observations, instruments for forming diagnostic conclusions or studies investigating the physiological bases of the diagnostic patterns. Preliminary work has started and instruments have been made, but we suggest that any instrumentation must necessarily be first validated by matching of the calibrated or scaled observations or judgments to observations made and agreed upon by relevant experts. Reliability of all observations and judgments are needed before any other tool, technology or more advanced approach can proceed and also whenever the natural system of diagnosis-treatment is applied in clinical trials. In this paper the authors highlight the core problems and describe a step wise process for addressing them.

KEYWORDS research, diagnosis, diagnostic methods, pattern identification, reliability, traditional East Asian medical systems

Traditional East Asian medical (TEAM) systems have unique concepts, languages and methods, but these are not culture bound as they have been transported and evolved over time in their origin countries, China, Japan and Korea and have been transported to non-Asian countries in Europe, Australia and the US where they continue to grow, change and start to thrive.

The fact that these therapies have extended over different times and cultural contexts has placed different needs on them that were not present as they started to develop and their foundations of practice were established. Since the mid-twentieth century with the continuing rise and dominance of scientific thinking and especially in the era of so-called 'evidence based medicine', there are many new demands and pressures on these systems of therapy. These pressures have grown across Asia from the late nineteenth century onwards, and since the 1970s in the West. In East Asia the strict requirements placed on TEAM based systems of acupuncture and herbal medicine have been slower to build probably due to prior acceptance of these

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therapies in those countries. Thus while a lot of research has been performed, the political contexts have been different and the purposes of the research different. But in Western contexts, there have been a lot more strict requirements for the therapies to gain acceptance. Thus when we look at the kinds of research needed for testing and validation of TEAM based diagnostic observations and conclusions, although the first work seems to have started in Japan, the bulk of the research until the last few years has been performed in the West.[1] However with major developments in science and technology, new systems of testing and validation have developed especially in East Asian countries where there is a new impetus to research TEAM based systems of therapy.[2-4]

What Are the Characteristics of the TEAM Based Systems of Acupuncture and Herbal Medicine?

(1) Both acupuncture and herbal medicine deliver treatments that possibly act upon multiple physiological pathways at once and thus might produce complex physiological responses in each patient. It is quite clear that the number of active substances in any given TEAM based herbal prescription is quite large, with the activation of multiple pathways to be expected. Over the last several decades research on the mechanisms of acupuncture have revealed a wide range of anatomical structures and systems that can be stimulated by acupuncture needling depending on the way of touching and palpating, the depth of needling, manner of needle manipulation and whether additional stimulation methods such as moxibustion heat or burning are used, whether electrical stimulation of the needles is used.[5-10] In modern clinical research, each therapy is thus a 'complex intervention'.[11,12] This complexity is further increased when the therapist also uses their judgments often based on the diagnosis (see next) to give lifestyle, dietary advice in order to change the patient further.[13-15]

(2) In general, the diagnoses of TEAM based acupuncture and herbal medicine have tended to look at pictures of the whole patient and rather than focus on a particular symptom, they have looked across a myriad of signs and symptoms to decide or identify the 'pattern' of diagnosis ('bianzheng' [辨证]in traditional Chinese medicine, [証决定] 'shokettei' in Japanese KeirakuChiryo [经络治療]). Naturally since the delivery methods of acupuncture and herbal medicine are different, their routes of physiological activation are quite different, consequently their diagnostic foci have tended to be different. Thus the patterns of diagnosis naturally used by herbalists and acupuncturists focus on different systems, often based on observations from different methods. By selecting across all possible observations that can be made in the [四诊] 'four diagnoses' of TEAM (looking, listening-smelling, touching and asking) tailored according to the theoretical constructs thought to be associated with the physiological targets, and confirmed through clinical practice and observation, unique 'patterns' are selected from which each system prescribes a treatment targeted to the individual patient's particular pattern of diagnosis.

(3) Each diagnosis pattern always comes with a prescribed treatment. With the exception of patients judged about to die (where treatment may be forbidden), there are no diagnoses in TEAM based treatment systems that are not matched with some kind of prescribed treatment (whether that treatment works or not was not the issue). Thus some practitioners have stated 'diagnosis is treatment'[16] with the complementary concept 'bianzheng lunzhi' [辨证论治]'treatment follows the pattern'.[17] The treatment usually has two targets, the first tries to correct the 'pattern' identified in (2), called the [治本法] 'root treatment' (zhibenfa/honchiho), the second tries to relieve the symptoms of the patient, called the [治标法] 'branch treatment' (zhibiaofa/honchiho).

(4) The manner of thinking in TEAM is based on different assumptions about the nature of the world than the dominant scientific ways of thinking.[18] There is a lack of seeking an 'objective' description of things; there is a virtual lack of exclusive thinking (typically termed 'either-or' thinking) – hence multiple competing and often contradictory concepts, models, systems of therapy have always been tolerated in East Asian culture, the development of a new method did not replace the old, as happens in modern scientific medicine;[19] things were generally seen as parts of a whole rather than as separate and separable, thus the kind of reductionist thinking that has been such a successful tool for scientific research and progress in the last centuries did not happen, instead the focus was on 'syncretistic 'thinking; also, given the above issues, there is a lack of simple causality models of thinking in TEAM based systems. Knowledge in TEAM has always been 'practice based', knowledge has been about problem solving in the world, rather than describing the nature or reality of the world (what might be called 'representational knowledge' in scientific discourse).[18,20] Thus, (a) although they

have been described in many books by many different practitioners, the patterns of diagnosis cannot be assumed to refer to objectively existing entities, their objectivity must first be established using appropriate methods – the diagnostic patterns have always been constructed in order to provide a treatment; (b) there is no evidence that any of the diagnostic patterns or observations refer to the 'causes' (in the scientific sense of the term) of the disease or symptom that the patient complains about, there is a lack of research and evidence that establishes causal connections between the diagnoses and health problems, regardless of what each system of therapy might say (for example Chinese medicine explicitly uses a language of causality [病因] the 'cause of disease' – but until appropriate research methods are used to establish causal connections it would be naïve and faulty to assume that this represents the same kind of causality that modern science describes and for which huge efforts and complex procedures are needed in order to establish it).[20]

(5) Treatments are rarely static. They usually evolve over time. In order to judge how to adjust treatment several factors might be taken into account. How have the symptoms changed and how has the patient responded to those changes or lack of changes? The TEAM-based diagnosis can take into account various findings and signs such as the appearance of the tongue, palpable qualities of the radial pulses, palpable qualities and findings on the abdomen, the complexion of the patient and so on.[16] How have the key diagnostic observations changed? How have the 'patterns' of diagnosis changed? This flexibility and changeability of treatment adds to the complexity of each treatment system (see item (1) above). It also places additional requirements on each system. The same research requirements needed for the validation of the diagnoses are also needed for these clinical observations and judgments. Figure 1 summarizes the core steps involved from start of diagnosis to end of treatment.

How to Proceed?

The above issues present significant challenges for research on TEAM based acupuncture and herbal medicine systems for which not enough work has been performed to date.[1,16,21,22] At the core of the diagnosis and treatment are observations and judgments, inherently subjective in nature. In the last decades attempts have been made to bypass this inherently subjective basis to the diagnostic and treatment selection processes in acupuncture and herbal medicine. Developing instrumentation that makes the observations (e.g. pulse machines calibrated to read the pulses,[23] computerized systems for analyzing tongue observations,[24] etc.) and more recently the development of instruments and scales for rating and judging the patterns of diagnosis such as 'kidney deficiency syndrome',[25] 'cold-heat' patterns[26] are examples of establishing a more 'objective' basis. But any instrumentation must necessarily be first validated by matching of the calibrated or scaled observations or judgments to observations made and agreed upon by relevant experts. Reliability of all observations and judgments are needed before any other tool, technology or more advanced approach can proceed and also whenever the natural system of diagnosis-treatment is applied in clinical trials.[1]

In the last few decades increasing evidence has emerged for how the physiology and pathophysiology of mammals and especially humans is extremely complex.[27-29] This complexity lies not only in the huge range of physiological systems that are found, each of which can be separately described. The complexity lies in the degree of interactions and influences of physiological pathways on each other and the behavioral patterns of each system. Describing and capturing these latter two aspects of physiological complexity has required the development of specialized

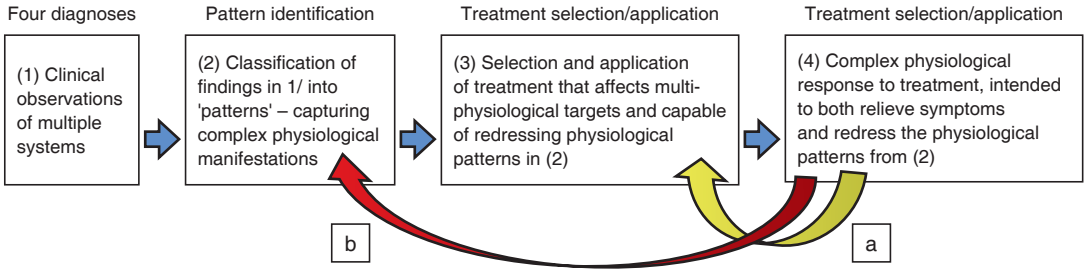

Figure 1. The Steps of Diagnosis and Treatment in TEAM Systems

Notes: a=feedback to treatment selection from patient response to modify treatment; b=feedback from patient response to verify pattern identification and change according toresponse (success or failure)

tools capable of doing that. A range of different tools, mostly from developments in the mathematical and computing sciences guided by major developments in physics and other scientific disciplines have clearly documented this complexity in many areas of normal physiology and pathophysiology. Increasingly scientists have started to accept that complexity is normal in physiological systems[30-34] and that both the dynamics of that complexity and the range of variables that interact force us to use these investigative and modeling tools in the study of health and disease. In recent years the techniques and tools from 'systems biology' and 'OMICS'[35-37] allow examination of the nature of the complexity of physiological systems, and offer the possibility of major advances in healthcare.[38,39] These tools also offer the first major technological breakthrough for dealing with the inherent complexity of TEAM therapies like acupuncture and herbal medicine,[2-4] and may provide a more natural fit for the complexities of the physiological systems assessed and the physiological systems affected by TEAM based treatments like acupuncture and herbal medicine. But the same fundamental studies of the observations and judgments of the 'pattern' are also needed for these lines of study of diagnostic and treatment systems in TEAM.

As a conclusion we suggest a step-wise process:

The first step is to make clear the diagnostic patterns and observations themselves by literature review, expert panels, and surveys, etc.

The second step involves the validation of the observations and judgments by reliability studies, and as needed, further studying of the methods with repeat of the reliability studies until satisfactory agreement is found.[40,41]

The third step is the development of instrumentation for the observations or judgments which will require appropriate technical testing and validation according to the technology chosen for the observations, coupled with matching of reliably agreed upon observations of relevant experts; for the judgments of pattern the instrument needs to be developed through a combined process of biometric development and testing coupled with correlation of reliably agreed upon judgments of the patterns.

The fourth step is to utilize the tools developed in the above steps in clinical practice or clinical studies, again matched to correlations of agreed upon observations and judgments, with adjustments and further validations as needed based on results. This step will also need to include other studies such as examining TEAM based outcomes and validating those with e.g. reliability studies. It may also be important to investigate reliability of point location[42,43] etc., as the treatments are applied. After these steps it starts to be possible to use these instruments in the more complex studies utilizing systems biology or OMICS research methods aimed at uncovering the complex physiological bases of the diagnoses and treatments.

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