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Research paper

How do acupuncture practitioners use pattern identification – An international web-based survey?

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ABSTRACT

Introduction: Training and practice of Traditional East Asian Medicine (TEAM) varies globally although similar diagnostic methods are used based on patients presenting signs and symptoms. These methods assist in determining disease patterns and treatment principles. The use of diagnostic principles and pattern identification (PI) was explored in this survey of TEAM practice across different countries.

Methods: A web-based survey was disseminated to acupuncture professional membership organisations in UK, Australia, Italy, Korea and China using a Survey Monkey link between December 2015 and September 2017.

Results: The 618 fully completed responses were available for comparison (UK 66, Australia 106, China 87, Italy 226, Korea 133). Demographic characteristics varied; UK practitioners were more likely to be female (71%) compared to the other countries (51-59%), Koreans tended to be under 40yrs (80%), compared to elsewhere (14-27%). Korean, UK and Australian respondents had fewer practitioners with biomedical training, 95% of the Italians had a biomedical qualification. TEAM diagnostic methods were more likely practised in the UK and Australian samples (> 90%) but were lowest for the Italian sample (78%). TCM differential diagnosis was the predominant type of PI. PI was rated essential by 85% of Chinese practitioners, versus 32% Koreans, 45% Italians, 67% UK and 68% Australian respondents.

Conclusion: This first international survey about acupuncturists use of PI demonstrated wide variation. The sample was limited to certain countries and relied on dissemination by specific professional bodies and participants completing an electronic questionnaire which may have affected responses but provides a platform for future studies.

1. Introduction

The availability of and access to acupuncture varies worldwide depending on the education and training of practitioners, government, local policy and regulatory frameworks [1,2]. The amount of study time and biomedicine content required for acupuncture practice varies between different countries, especially between Western countries and those in East Asia [2–6]. In China, traditional Chinese medicine (TCM) is based on different interventions, mainly herbal medicine, acupuncture and moxibustion, and manipulation (bone-setting). Acupuncture in China is studied in tandem with herbal medicine until specialisation but this is not the case for other countries where herbal medicine is studied as part of postgraduate studies [7].

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1.1. Traditional East Asian Medicine (TEAM)

Given the diversity of acupuncture practice in many countries, and for the purposes of this study, the traditional medical practices in East Asian countries, including acupuncture and herbal medicine, have been defined as Traditional East Asian Medicine (TEAM).

In different countries, acupuncture practitioners of TEAM use similar diagnostic methods based on the signs and symptoms exhibited by their patients [4]. These assist the identification of 'patterns' which are used to determine treatment principles. This process is commonly known as pattern identification (PI), pattern diagnosis, pattern discrimination, pattern/syndrome differentiation and describes physiological and pathological signs and symptoms in the patient according to traditional medical theory, thereby guiding treatment. PI is the basis of providing holistic and tailored treatment by taking into account environmental, psychosocial and individual factors to provide patient centred care and is the basis of the terminology used in this study.

Such patterns of disharmony are identified in the body's energy (*qi*), body organs and bowels (*Zang fu*) and in the meridians (*jingluo*). The TEAM approach to taking a medical history corresponds well to the experience of a "lived body," where the personalized descriptions of symptoms fit well into different TCM theoretical frameworks. These frameworks are not only suitable as a diagnostic strategy, but may also facilitate an understanding in the patient that the acupuncturists focus is on "wholeness" rather than on one symptom only [8].

1.2. Types of pattern identification

According to one respected source [9] there are 10 types of PI used in contemporary Traditional Chinese Medicine (TCM):

- Eight principles - *Ba Gang*
- Five Phases - *Wu Xing*
- QI & blood - *Qi Xue*
- Fluid & humor – *Jin Ye*
- Viscera and bowels - *Zang Fu*
- Channel network vessel – *Jing Luo*
- Disease cause – *Bing Yin*
- Six divisions – *Liu Fen*
- Four divisions – *Si Fen*
- Three Burners – *San Jiao*

The 'Eight Principles' (*Ba Gang*) approach involves classifying signs and symptoms according to four pairs of different disease qualities (heat(*re*)/cold(*han*), excess(*shi*)/deficiency(*xu*), external(*biao*)/internal (*li*), *yin/yang*) [10]. Although it is considered to be one of the core PI systems in TCM any one of the ten can be used as a stand alone system or they can be combined for a more comprehensive diagnosis [11].

Other PI approaches may be especially important for those practitioners who do not practice in a TCM style. PI varies based on the texts used, expert opinion and the training and education of practitioners [1,2] and subsequently their clinical practice experience. As different methods and different schools have developed over time they may coalesce or be used in conjunction with each other, rather than being replaced by the next generation of ideas [4].

1.3. Research on pattern identification as part of traditional East Asian medicine practice

Several UK surveys have produced data on different TEAM styles of practice [1,12–15] but these have not particularly focused on PI, and detailed information is therefore lacking. The aim of this study was to conduct an international survey of Traditional East Asian Medicine (TEAM) practitioners to explore differences in training, education and clinical use of those traditional medicines that have their origin in Chinese medicine. The term TEAM was used to capture the range of approaches in East Asia (e.g. TCM in China, 'Sasang' and 'Saam' (Korea), 'Keiraku Chiryo' (Japan), many of which developed in different countries over time.

1.4. Why is pattern identification important globally?

Pattern diagnosis/identification has now been included in the latest version of the World Health Organisation's International Classification of Diseases, ICD-11, and was adopted by the member states on 25 May 2019 in the supplementary Chapter 26, for optional use (https://www.who.int/news-room/detail/25-05-2019-world-health-assembly-update). This chapter refers to disorders and patterns which originated from Traditional Chinese Medicine (TCM) and are commonly used in China, Japan, Korea, and in other countries around the world. The listed patterns are standardized items of pattern identification, therefore, necessary action may be needed to apply these patterns among the activities of education, research and practice. The inclusion of TCM type patterns in the ICD-11 also presents challenges for the TEAM field since unlike the biomedically based diagnoses that comprise the ICD, the traditional PI diagnoses are not yet evidence based. These methodological and research needs are discussed in other papers in this special issue on PI in TEAM practice.

This survey was designed as a preliminary exploration into the possible international differences in the use of pattern diagnosis. Collection of such information could inform future research strategies, define educational needs, help future clinical training, and assist in-informing policy. We believe that this is the first such international survey of its kind to focus only on TEAM diagnostic practices across different countries.

2. Methods

2.1. Study design

An electronic questionnaire using a www.surveymonkey.com link was sent to a key individual in each country who was asked to disseminate the link to their acupuncture network during the study period (See Fig. 1). Data was collected during December 2015–September 2017.

2.2. Participants and recruitment

Country participation for individuals was based on the authors' current links to acupuncture membership organizations and a clinical site in the case of China. Purposive convenience sampling of TEAM practitioner associations was used which varied from country to country.

- United Kingdom - British Acupuncture Council (BAcC) and the Association of Traditional Chinese Medicine (ATCM).
- Australia - the Australian Acupuncture and Chinese Medicine Association (AACMA)
- Italy - the Association of Medical Acupuncturists of Bologna (AMAB)
- Korea - the Society of Preventive Korean Medicine (SPKM) and the Society of Integrative Korean Medicine (SIKM)
- China - Rehabilitation unit in Heilongjiang University of Traditional Chinese Medicine.

The countries chosen represented the countries of origin of the survey team apart from Italy where there had been previous collaboration. This was a voluntary survey and the survey participants were told that completion should take no longer than 15 min, would be completely confidential, that individual results would be aggregated and data were anonymous. Consent to participate was implied by completing the survey.

UK: 66 responses from about 3500 target members (1.9%). The survey portal was active from February 2015 to March 2016
Australia: 106 responses from 1600 members (6.6%). March to July 2015
Italy: 226 responses. The target professional body membership is 535 but the survey link was forwarded to unknown other Italian associations, with unknown numbers of members. Nevertheless nearly all of the replies came from members of the AMAB, meaning a response rate close to 40%. October –December 2015.
Korea: 133 responses. The two societies targeted had 150 members but most responses came from two Korean online groups, so the numbers of practitioners contacted may have been far in excess of this. The survey portal was active from July 2016 to January 2017.
China: 87 responses. The survey link was intended to be forwarded opportunistically and to spread in an uncontrolled manner, not aimed exclusively at a particular group. Although most of the respondents trained in China fewer than half were living there or speaking Chinese in the clinic. Substantial numbers lived in the UK and North America and English was spoken by more than half of the whole sample. Hence, this is a sample unlike those of the other countries as it was not representative of Chinese practice in China although training had occurred in China. The survey portal was active from July 2015 to July 2017.

Fig. 1. Survey response rates by country.

2.3. Survey development and variables

The questionnaire was designed in English and piloted by the authors and then translated into Italian, Chinese and Korean. Once translated, another individual was asked to translate the questionnaire back into English in order to check that meaning had not been lost. After this process the questionnaire was finalized and disseminated. The 24 questions covered; practitioner demographics, TEAM and biomedical education, professional affiliation, years in practice, whether part- or full time, practice setting, treatment modalities, numbers of patients treated, perceived effectiveness of TEAM for different conditions, any specialisation, biomedical and TEAM diagnostic tests and methods used, PI education, PI principles used in practice and the perceived importance of PI for clinical practice. All questions offered closed answer options though some also provided the opportunity for respondents to reply in their own words. The English version questionnaire can be seen in Appendix1.

2.4. Statistical analysis

Frequencies and percentages were calculated for each response category by Survey Monkey and these formed the basis of the initial analysis. The data were also extracted from Survey Monkey and analysis of the survey results performed.

For the two-way data questions, weekly patient number categories vs treatment method, and diagnostic methods vs treatment methods, there was no correct percentage calculation that could be conducted using Survey Monkey that allowed direct comparison across the different country samples. Given that estimating patient numbers was not a main focus for the paper, these data were discarded from the analysis.

For diagnostic methods, the category percentages were calculated in relation to the 'Asking' item being set at 100% (this item consistently had the most responses), allowing a standardised comparison of diagnostic methods within and across countries.

Data on professional affiliation were omitted, because it appeared that translation of the term 'professional membership' was not clearly understood in some languages.

2.5. Ethical considerations

Ethical approval was sought and provided by the ethics committee at London South Bank University.

3. Results

3.1. Response rate

A total of 1286 individuals accessed the survey link. Of these, half did not attempt the survey, 22 people began the questionnaire but did not complete; and 618 returned fully completed forms. It was possible to derive accurate response rates only for the UK and Australia. Elsewhere it became evident that some questionnaires were being returned by other acupuncturists in addition to those in the target professional associations. Country response rates are given in Fig. 1.

3.2. Demographics of sample

UK practitioners were predominantly female (71%) and for three other countries the gender balance was less marked (51-59%) (Table1). By contrast the Korean sample was largely male (76%). The Koreans were also markedly different in age profile, with 80% under 40yrs, compared to 14–27% elsewhere. The Chinese sample was the oldest (62% over 50 yrs), and the other three countries (44-49% were over 50yrs). The UK and Australian samples had the lowest proportions (4 and 7% respectively) of acupuncturists with PhDs/Post-docs and Italy the highest (27%), with China and Korea intermediate (18 and 15% respectively) (Table1).

3.3. Population characteristics in relation to TEAM practice

Years in TEAM practice showed a similar pattern to practitioner age with 95% of Korean respondents having practiced for less than 15 years. In contrast only 31% of Chinese respondents were in this category and 37% had been in practice over 30 years (Table 2)

For the most part practitioners worked almost exclusively in the designated language for their own country but China was the exception: fewer than half used Chinese, and more used English. Forty six (46) out of 80 did not currently live in China, with 17 residing in the UK and 14 in the US or Canada.

Half to two thirds of UK and Australian respondents were in full time acupuncture practice compared with 80% in China and 97% in Korea, but only 15% in Italy (Table 2). The Italian respondents also had

Table 1
Demographic characteristics (% respondents by country).

Gender	UK	Australia	Italy	China	Korea
Female	72.7	56.6	58.8	51.2	23.4
Age					
18-29	3.0	2.8	5.9	2.5	21.1
30-39	13.6	20.8	20.8	11.2	58.6
40-49	39.4	27.4	24.0	23.8	19.5
50-59	28.8	31.1	28.5	36.2	0.8
60+	15.2	17.9	20.8	26.3	0
Education					
Doctorate	1.5	7.5	20.0	17.9	14.6
Post-doctoral	3.0	0	6.3	8.3	2.3

Table 2
TEAM practice characteristics by country (% respondents in each country).

Years in TEAM practice	UK	Australia	Italy	China	Korea
< 15 years	63.7	52.8	72.0	30.9	95.4
15–29 years	28.7	34.9	20.8	32.1	4.6
30+ years	7.6	12.3	7.2	37.0	0
Part time or full time practice					
Full time	53.0	64.2	15.4	79.8	97.0
Part time	45.5	35.8	74.7	14.3	1.5
Not in practice	1.5	0	9.9	5.9	1.5
Practice setting[a]					
Private – single practice	65.2	53.8	75.6	48.7	57.8
Private – group practice	45.4	46.2	11.3	18.7	2.3
GP practice (1y care)	**1.5**	**5.7**	**13.1**	**5.0**	**21.9**
Hospital (2y care)	0	2.8	16.7	23.8	15.6
Not in practice	1.5	0	4.1	6.3	0.8
Other	7.6	3.8	3.2	3.7	2.3
Additional medical training[a]					
None	71.2	64.2	1.8	48.4	96.2
Western doctor	7.6	0.9	95.5	36.9	2.3
Western nurse	6.1	8.5	0	2.4	0
Physiotherapist	1.5	3.8	0	4.8	0.8
Dietician	0	0	0.4	2.4	0.8
Other therapist	15.2	24.5	9.5	11.9	1.5
Main language used in practice					
English	92.4	99.1	8.4	43.0	
Chinese	3.0		4.5	40.5	0.8
Italian			85.5		
Korean					99.2
Japanese				3.8	
German				3.8	
Other	4.6	0.9	1.6	8.9	

[a] Respondent could have more than one answer.

the largest numbers of acupuncturists (10%) not currently in TEAM practice. UK and Australia practice arrangements were also similar regarding where the clinical services were delivered: predominantly in private practice, with both group and single handed practices being well represented. Hospital settings scarcely featured in these two countries but made up 15–25% for the other three countries, with group private practice being much less common. Korea, and to a lesser degree - Italy, were the only countries with significant numbers working in biomedical general practice settings.

The Korean, UK and Australian respondents consisted of very few biomedical doctors whereas 95% of the Italians and 37% of the Chinese respondents reported this qualification. UK and Australia had significant numbers of 'unspecified other' therapists.

3.4. Use of different TEAM treatment modalities

Manual acupuncture was used by virtually 100% of acupuncturists in all countries except China (78%) (Table 3). There were lower but fairly consistent levels of electro acupuncture used (32–59%) and insignificant laser use except in Italy (21%). Korean respondents practised the least ear acupuncture (20%) and the UK respondents, the most (70%). Chinese respondents used higher levels of scalp acupuncture (45%); with UK and Australia close behind (38 and 35% respectively) but scarcely at all in the other two countries. Trigger points were used extensively by all countries (40–70%) but intradermal needles (54%) and Shonishin (14%) were much more highly represented in the Australian sample than elsewhere. Korean hand acupuncture use was low everywhere, even within Korean

Moxibustion use was highest for Australian respondents (52% direct, 73% indirect) and the UK (41% and 64%) with Italian practitioners reporting the least use (32% and 31% respectively). The Korean respondents were unusual in the magnitude of difference between use

Table 3
Techniques (%) used in practice by country.

Techniques used in practice	UK	Australia	Italy	China	Korea
Acupuncture/manual	100	97.2	96.5	78.2	99.2
Electroacupuncture	45.0	48.1	31.9	46.0	58.6
Laser acupuncture	0	20.8	4.0	3.5	3.8
Auricular acup	68.2	64.1	49.1	40.2	21.8
Scalp acupuncture	37.9	34.9	8.9	44.8	7.5
Trigger point acup	59.1	67.0	42.9	47.1	70.7
Intradermal acup	25.8	53.8	5.7	13.8	30.8
Shonishin	4.6	14.2	0.9	1.1	2.2
Korean hand acup	9.1	4.7	0	1.2	2.3
Moxa/direct	40.9	51.9	31.9	37.9	19.6
Moxa/indirect	63.6	72.6	31.4	44.8	61.6
Gua sha	25.8	50.9	9.3	43.7	3.8
Cupping/dry	71.2	77.4	35.0	69.0	73.7
Cupping/wet	7.6	26.4	10.6	36.8	75.9
7 star hammer	6.1	20.7	12.8	34.5	0.8
Bleeding	7.6	26.4	19.0	29.9	49.6
Massage/Chinese[a]	37.9	47.2	7.1	57.5	45.9
CHM/raw	18.2	20.7	1.3	41.4	18.0
CHM/decoction	7.6	16.0	2.2	66.7	89.5
CHM/pills	12.1	66.0	11.1	63.2	66.4
CHM/granules	15.1	54.7	1.3	62.1	75.9
CHM/powders	27.3	28.3	2.6	41.4	46.6
Advice/diet	68.2	77.4	18.6	56.2	36.8
Advice/exercise	62.1	67.9	15.5	51.7	21.8
Advice/other	62.1	71.7	47.3	56.3	44.3
Other	10.6	23.6	7.1	9.2	3.0

[a] Chinese style massage was the most popular option for all countries; other massage choices not tabulated.

of direct (20%) and indirect (62%) moxibustion. Dry cupping was used by around 70% of practitioners in all countries except Italy. Only the Korean respondents employed wet cupping at very high levels (76%). In all five countries Tuina was the most favoured massage approach with usage levels similar at 40–60% of respondents.

The most prevalent, herbal delivery mode varied across countries with decoctions in China and Korea, pills in Australia and Italy and powders in the UK, but overall levels of use were only 11 and 27% for Italy and the UK respectively, compared with 66 and 67% for Australia and Chinese respondents and 90% for Korean. Chinese respondents used more raw herbs for decoctions than respondents in other countries; with Korean respondents using more decoctions and granules. Italy used the least of all herbal delivery modes.

Combined use of herbs and acupuncture was reported by 100% of the Korean sample and 87–88% for Australian and Chinese respondents, but the UK (39%) and Italian (27%) samples were completely different (Table 4).

The Australian practitioners more frequently reported they provided advice, be it diet (77%), exercise (68%) and 'other' advice (72%).

3.5. Conditions specialised in and those believed to respond well to acupuncture

Around half (UK, Australia, China) and 70% (of the Korean acupuncturists did not specialise in treating particular diseases but Italy was the exception, with 82% describing themselves as pain specialists (Table 5). Pain was one of the foremost specialist reasons for providing

Table 4
Do practitioners use herbs and acupuncture together?

	UK	Australia	Italy	China	Korea
Yes – often	21.2	55.7	5.3	57.5	54.9
Yes – sometimes	18.2	32.1	22.1	29.9	45.1
No	60.6	12.2	72.6	12.6	0

(Presented as % respondents by country).

Table 5
Specialist areas of practice by country.

Specialist areas of practice[a]	UK	Australia	Italy	China	Korea
None	50.0	52.8		57.5	69.2
Obstet/gynaecol	30.3	27.4	31.4	16.1	3.0
Pain	24.2	33.0	82.3	26.4	17.3
Stress	22.7	26.4	36.7	12.6	2.3
Gastrointestinal	10.6	12.3	21.2	16.1	8.3
Wellbeing	10.6	20.8	24.3	17.2	2.3
Other	9.1	12.3	5.3	4.6	0
Neurological	7.6	4.7	8.8	12.6	2.3
Allergic	6.1	9.4	18.6	6.9	2.3
Psychological	6.1	13.2	16.4	14.9	2.3
Cancer	4.6	5.7	4.9	6.9	0
Dermatological	4.6	5.7	8.4	14.9	1.5
Ophthalmic	3.0	0.9	0.9	2.3	0
Rheumatological	3.0	5.7	18.1	12.6	2.3
Post-viral	1.5	5.7	2.2	10.3	0
Respiratory	0	4.7	5.8	3.4	1.5
Blood	0	5.7	3.5	4.6	0
Cardiovascular	0	6.6	2.2	9.2	5.3
Immuno-deficiency	0	3.8	3.5	2.3	1.5
Renal	0	0.9	0.4	3.4	2.3
Mean number of responses per person	2.0	2.6	2.95	2.6	1.2

[a] Respondent could have more than one answer.

acupuncture for other responding countries (though for no more than 33%). Other notable specialist areas were obstetrics/gynaecology (maximum frequency 31%), stress (max. 37%) and wellbeing (max 24%).

Perceptions of which conditions responded best to TEAM were largely in line with the specialities (Table 6). Pain was in the top two for all countries and obstetrics/gynaecology in the top three for four countries. Gastrointestinal conditions were in the top four for all responding countries and wellbeing also had a fairly good rating across the samples. Allergic and dermatological conditions were rated highly/fairly highly within the Italian, Chinese and Korean respondents and psychological conditions rated reasonably high for the UK, Italian and Chinese respondents. The only other area with a consistent "top 10" rating was for the disease area of rheumatology. There were also some notable differences between country respondents, for example a much greater perception of effectiveness in treating stress related conditions in the two European countries (UK and Italy) and Australia compared to the two East Asian countries, China and Korea.

Table 6
Reported conditions responding best to TEAM (% respondents by country).

Reported conditions responding best to TEAM[a]	UK	Australia	Italy	China	Korea
Pain	75.8	70.8	93.8	63.2	67.9
Stress	59.1	61.3	71.7	34.5	35.3
Obstet/gynaecol	40.9	52.8	62.8	56.3	30.8
Gastrointestinal	39.4	30.2	57.5	54.0	75.2
Psychological	24.2	8.5	29.2	20.7	13.5
Wellbeing/prevent	21.2	25.5	52.2	27.6	26.3
Rheumatological	12.1	3.8	38.0	27.6	3.8
Dermatological	10.6	4.7	27.0	28.7	21.8
Postviral	9.1	2.8	13.7	16.1	2.3
Allergic	7.6	8.5	42.5	37.9	35.3
Other	7.6	5.7	5.3	4.6	2.3
Neurological	4.6	3.8	11.5	13.8	9.8
Cardiovascular	3.0	2.8	7.5	18.4	3.8
Immunodeficiency	1.5	0.9	2.2	4.6	3.8
Ophthalmic	1.5	0	2.2	2.3	2.3
Renal	1.5	0	1.3	10.3	2.3
Respiratory	1.5	8.5	15.0	16.1	2.3
Blood	0	1.9	3.1	9.2	3.8
Cancer	0	0.9	5.3	11.5	0.8
Mean	16.9	15.4	28.5	24.1	18.1

[a] Respondent could have more than one answer.

Table 7
Diagnostic methods and tests regularly used by respondents by country(%).

Diagnostic methods and tests regularly used[a]	UK	Australia	Italy	China	Korea
Biomedical methods	24.2	35.9	63.3	43.7	27.8
Biomedical tests	21.2	46.2	58.4	40.2	22.6
TEAM methods	92.4	94.3	77.0	83.9	81.2
None of these	3.0	5.7	10.2	8.0	7.5

[a] Respondent could have more than one answer.

3.6. Diagnostic methods and tests

Biomedical methods (e.g. auscultation) were used by 24–63% of respondents, lowest for UK and highest for Italian practitioners. Biomedical tests (for example X-rays or blood tests) follow a similar rank order and size (21–58%) (Table 7). TEAM diagnostic methods were most likely practiced in the UK and Australian samples (> 90%) and lowest for Italian

When only using acupuncture, 'looking' and 'asking' as principle diagnostic aids were each employed by nearly all practitioners in all five countries (Table 8). 'Listening/smelling' was somewhat less popular, around 75–80% of the 'looking' and 'asking' levels in China and Korean respondents and much lower for Italian practitioners. Tongue and radial pulse diagnosis were commonly used, except by Korean respondents, where tongue diagnosis and pulse taking were used only half as frequently as part of diagnosis compared with 'looking/asking'. Abdominal and channel palpation were moderately used in most

Table 8
TEAM diagnostic methods used for different treatment modalities by country.

TEAM diagnostic methods used for different treatment modalities[a]	UK	Australia	Italy	China	Korea
ACUPUNCTURE					
Look	100	100	94	90	86
Listen & smell	92	95	53	76	79
Ask	100 (63)	100 (81)	100 (206)	100 (50)	100 (73)
Electro-dermal	5	4	3	16	14
Tongue	98	88	94	92	42
Pulse/ radial	97	96	81	88	41
Pulse/other	13	28	13	32	12
Palpate/abdomen	48	60	42	56	55
Palpate/channel	59	75	35	60	15
HERBS					
Look	100	100	71	94	92
Listen & smell	94	98	50	100	92
Ask	100 (17)	100 (48)	100 (14)	100 (51)	100 (62)
Electro-dermal	0	4	7	6	22
Tongue	100	96	71	100	113
Pulse/ radial	94	94	71	98	103
Pulse/other	29	21	7	10	29
Palpate/abdomen	29	46	21	43	94
Palpate/channel	29	33	28	14	32
ACUPUNCTURE + HERBS					
Look	109	97	106	92	89
Listen & smell	95	94	64	92	85
Ask	100 (22)	100 (18)	100 (31)	100 (52)	100 (116)
Electrodermal	0	4	6	8	9
Tongue	100	100	100	100	81
Pulse/ radial	100	96	100	94	70
Pulse/other	27	22	13	27	26
Palpate/abdomen	41	58	42	44	75
Palpate/channel	36	56	29	41	17

Note: presented as % of 'to ask' for each country: in parentheses are absolute numbers using 'to ask'.

[a] Respondent could have more than one answer.

countries, though the latter was particularly high for Australian and very low for Korean respondents. Other pulse methods were used to a modest degree, being higher for Australian and Chinese practitioners. Electro dermal approaches were used by a small minority among by Chinese and Korean respondents and scarcely at all by other acupuncture practitioners.

For those reporting using "herbs alone" the pattern of diagnostic methods used was similar to the acupuncture practice described above, with two notable exceptions. In the Korean sample, tongue and pulse diagnosis were used more than 'looking' and 'asking' (whereas with acupuncture they were used only half as much). Also abdominal palpation use was exceptionally high by Korean practitioners and this was very different to responses from practitioners in other countries.

When combining the use of herbs and acupuncture, the patterns were again similar.

3.7. Pattern identification

TCM differential diagnosis was the predominant type of PI reported by practitioners from all five countries as being included in their TEAM education (88% for UK participants > 90% for the other four country respondents) (Table 9).

The next most frequently reported PI methods was the use of "Five Element" diagnosis: 50–70% of participants in three countries but only 22% and 8% respectively for Chinese and Korean respondents. Korean PI (Sasang) was the second most frequently studied diagnostic system in Korea (41%) but hardly at all elsewhere. Japanese PI featured for 24% of respondents in Australia but less than 10% elsewhere.

3.8. Pattern identification in clinical practice

Congruent with what was learnt in training, when in practice most of the respondents said that they used TCM associated PI methods: *Zangfu* (79–91%), *Ba Gang* (65–86%), *Qi Xue* (70-78%) and *Yin Yang* (74–86%), though uptake was considerably lower for the Korean respondents (74, 54, 50, 50% respectively) (see Table 10). On the other hand *Sasang* PI was used by 30% of Korean respondents (0–9% elsewhere) and pragmatic herbal methods by 44%, 3–21% elsewhere. Five Element diagnosis was most common for UK and Australian respondents (50, 57%), but less for Chinese (36%), Italian (26%) and Korean (11%) respondents. "Stems and Branches" (*zi wu liu zu*) diagnostic system use was most prevalent for Australian respondents (24%, otherwise < 10%), as was *Keiraku* (13%) and other *jing luo* methods (40%). Channel diagnosis was strongly favoured by all country respondents (77–86%) except for Korean practitoners (38%).

The importance of PI in clinical practice was rated very highly by all country respondents but there were differences in emphasis (Table 11). Of the Chinese practitioners (85%) rated PI as essential in all circumstances, compared with 32% of Korean, 45% Italian, 67% for UK practitioners and 68% for Australian respondents. Substantial proportions of respondents from Korea (46%) and Italy (32%) saw it as essential only for some Chinese modalities. Fewer than 20% of all respondents in all countries saw PI as essential, but only for some diseases. Between zero and 15% described it as optional and four respondents reported that it was unhelpful.

Table 9
Type of Pattern Identification (PI) included in TEAM education (% respondents by country).

Type of Pattern Identification (PI) included in TEAM education[a]	UK	Australia	Italy	China	Korea
TCM differential diagnosis	87.9	95.3	92.5	98.8	94.0
Five element acupuncture	53.0	69.9	54.9	21.8	29.3
Japanese	6.1	23.6	0.9	2.3	8.3
Korean	3.0	1.9	0.4	2.3	41.4
Other	12.1	8.5	3.5	3.5	2.3

[a] Respondent could have more than one answer.

Table 10
Principles of PI used in diagnosis (% respondents in each country).

Principles of PI used in diagnosis[a]	UK	Australia	Italy	China	Korea
Zang Fu	87.9	85.8	79.2	90.8	73.7
Jing Luo	86.4	87.7	80.5	77.0	37.6
Ba Gang	65.1	72.6	69.9	86.2	54.1
Qi Xue	72.2	77.4	70.4	74.7	49.6
Yin Yang	83.3	84.9	73.9	86.2	50.4
Sasang	0	1.9	1.8	9.2	30.1
Keiraku	1.5	13.2	1.3	2.3	7.5
Wu Xing	50.0	56.6	26.1	35.6	11.3
Stems & Branches	9.1	24.5	1.3	5.8	1.5
Other Meridians/ Six Channels	27.3	39.6	4.0	25.3	14.3
Pragmatic herbal	9.1	18.9	3.1	20.7	43.6
Other	6.1	13.2	4.0	4.6	2.3

[a] Respondent could have more than one answer.

Table 11
Importance of PI in current clinical practice (% respondents in each country).

Importance of PI in current clinical practice	UK	Australia	Italy	China	Korea
Essential – always use it	68.2	67.0	45.1	85.1	31.6
Essential only for some treatment modalities	10.6	6.6	31.9	6.9	45.8
Essential only for some diseases	10.6	17.9	15.9	4.6	8.3
Optional	9.1	3.8	4.4	0	14.3
Unhelpful	1.5	0	0.9	1.1	0
Other	0	4.7	1.8	2.3	0

4. Discussion

In recent years, research appears to show a downward trend in practitioners completing surveys, including those conducted via professional acupuncture bodies [12–16]. In this survey, the number of respondents for each country was also fairly low (except for Italy). The UK response rate (< 2%) was much lower than the corresponding figure (11%) in a European survey of TEAM professional bodies, where the overall average across 14 countries was 25% [17]. Also markedly different to our results was the 96% response rate from the eight Chinese hospitals sampled in the China-EU comparative survey, however in that study data was collected face to face rather than electronically [1].

There were differences in the demographic characteristics of the participants. The Korean sample stood out as being predominantly male and much younger than elsewhere, with correspondingly least time in practice. In the previous EU/China international comparison the sex ratios were similar to the present study but the age profile of the Chinese sample was entirely different, with only 4.5% over 50 rather than 62% observed in this survey [1]. This difference may reflect the specific nature of the Chinese sample which was not just related to a specific professional grouping but included a specific clinical site. Given the peculiarities of this Chinese sample, with only a minority of them living in China or using the Chinese language in their acupuncture practice, the data are unlikely to be representative of Chinese TEAM practice.

There are large differences in education, training and regulation in TEAM affecting who can practice, where and how they can practice and the degree of integration with western medicine [2].

In Italy almost all practitioners surveyed were also biomedical doctors, as TEAM practice in Italy requires a medical qualification. This may explain some of the differences between the country samples. Thus the Italians largely work as TEAM practitioners on a part-time basis, most of their time being spent in western medicine clinical practice and

acupuncture being used as an adjunct. They are more likely to have a higher degree, with 80% specialising in pain treatment, the highest users of biomedical diagnostic methods/tests, with herbal medicine use low, and laser use considerably higher than respondents from other countries.

TEAM was mostly practiced privately, regardless of biomedical qualifications, whereas in the earlier EU-China survey the Chinese were sampled from hospitals, and 96.5% practiced in that setting [1].

Substantial proportions of respondents in all countries used manual acupuncture, electro-acupuncture (EA), trigger points, tuina, moxibustion, cupping and some form of lifestyle advice. Manual acupuncture use has previously been found to be similarly high in China and EU countries though EA was considerably less used in China than in our sample [1]. In the same China-EU survey there were comparable levels for use of massage and for diet and exercise advice, though the EU countries were more likely to offer other health advice [1]. Xue et al., indicated more training on diet and exercise was included in the Australian degree programmes, which is reflected in the results obtained here [2].

There were variations within our data, for example, little direct moxibustion use for the Korean respondents, less cupping and health advice given by Italian and Korean practitioners. Other treatments featured significantly in some countries but not others, for example auricular and scalp acupuncture had low use by Korean practitioners while; herbal medicine use was low for UK and Italian respondents. Other treatments had significant use only in one or two countries, such as *Shonishin* and intradermal acupuncture by Australian practitioners. The country comparisons for combinations of acupuncture with either moxa or herbs or tuina, understandably correlate closely with their single use.

In general, most TEAM practitioners in Italy and the UK do not administer herbal medicine, only acupuncture, which may be due to the lack of dual training programmes: contrast this with Australia, China [2] and Korea which also have dual training programmes. Most of the UK sample, and all of the Italian, were drawn from acupuncture professional bodies; elsewhere they represented TEAM more widely. Other variations in practice modality use are less easy to explain, such as sampling artefacts, but other differences may represent the true picture. Real differences could have arisen from recent influences, for example, a particular renowned practitioner starting to teach in a different country.

The majority of respondents did not specialise in disease areas (except in Italy as discussed above), but when they did, the favourite choices were first pain, second obstetrics/gynaecology and then stress related illnesses and the promotion of wellbeing. Although the previous China-EU survey did not ask about specialisation, however it did record what were the most commonly treated conditions [1]. There is a close correspondence between these two datasets for the EU countries but not for China, where neurology was by far the most prevalent disease category treated (43%), but it was not one of the top specialities found in the current survey. This could be partly due to the previous sample being hospital doctors and located in a rehabilitation unit, and also because the earlier China-EU project focused entirely on acupuncture, not herbs as well.

The results on which conditions were thought to best respond to TEAM treatment matched closely to those in the China-EU study [1]. Although the TEAM practitioners' perceptions in this respect were quite clear they may not specifically match data in systematic reviews. Reviews have shown that acupuncture works well for pain [18–20] and probably mental health conditions like stress, anxiety, insomnia, depression [19–21]. Less evidence is available for obstetrics and gynaecological conditions and gastrointestinal conditions and more research is required [19,20]. It is unknown whether most practitioners are acquainted with this research. The evidence picture with respect of herbal medicine may be quite different from that of acupuncture. There has been much less herbal research in the West compared with that for acupuncture and the Chinese data is largely inaccessible to non-Chinese speakers [19,20]. In this survey, the use of biomedical diagnostic methods and tests varied across the responding countries in a manner that appears largely to correlate with the biomedical background and experience of the practitioners and the amount of biomedicine in the TEAM training courses. The Australian sample had few doctors but their TEAM training has a greater biomedical focus than in the UK [2].

In a previous study, Chinese participants were much more likely to use biomedical diagnostic procedures than those in the EU [1]. UK and Australian practices are generally established outside "the medical world" and in China and Italy; the practice is situated within "the medical world". Korean medicine is supported by the state and is included in national policy.

Of the TEAM diagnostic methods, looking, asking, tongue and radial pulse diagnosis were used extensively, but listening and smelling diagnostic approaches were less. The observation that the Italian sample showed a much lower use of the technique of listening/smelling may have been a reflection of the strong biomedical background of these practitioner respondents. The use of pulse and tongue methods appeared to be much less prevalent in Korean acupuncturists than the herbalists, a phenomenon not seen elsewhere. This may well represent the true situation but the reasoning behind it needs investigation.

The TCM style of pattern identification was the one predominantly learned in all five countries along with its various associated principles, such as diagnosis according to the *Zangfu* or Eight Principles, which were the most commonly used in practice, along with channel diagnosis. Five Element PI was overall the next most commonly taught style, reported at a high level in the UK, Australia and Italy, but for clinical use the level was somewhat lower in Australian practitioners and much lower in Italian respondents. The wording for the question on education was simply '5-element acupuncture', whereas for use in practice it was associated more explicitly with the constitutional factor style developed in the UK by Worsley [22]. This style has spread to Europe, North America and Australia, but scarcely to East Asian countries. The 36% use among Chinese practitioners is most likely an artefact of the particular sample, but could reflect a rekindled interest in other (non-TCM) styles [23]. *Keiraku* also tends to be reported less in practice than learned, as does *Sasang* for the Korean respondents, though they appear to use an assortment of methods (some of them not included in this survey) [24]. Korean PI procedures give the Korean respondents a rather unique profile, with less TCM and much less channel diagnosis than reported elsewhere. This may have been due to the professional association approached. By contrast, the Australian practitioners had more of a universal profile. As with their assimilation of diagnostic methods, so too with the PI principles, they showed higher than average levels of use across most of the options. This may reflect Australia's position as both part of the Western orbit but also in the Pacific rim, with a substantial East Asian influences.

Previously published acupuncture surveys have identified TCM as the predominant approach in Europe, used by 80-90% of practitioners and Five Element next with 42–53% [12,14,15] which is confirmed by this survey.

Given the reported high levels of training and use of PI it would be expected that most acupuncture practitioners regarded it as an important aspect of clinical practice. It is less easy to explain why the Chinese sample largely rates it as essential in all cases while most of the Korean and Italian respondents saw it as essential only in certain circumstances. It is unknown whether practitioners found the use of the more prevalent TCM style in PI diagnosis less useful outside of herbal medicine practice for certain conditions like pain. Further research would be required to investigate what such circumstances might be and hence why PI became less important. Disease category was not strongly associated with low PI use though it could be hypothesised that, for example, the treatment of musculoskeletal problems might be done in a more symptom-focused manner where PI could easily be by-passed. Treatment modality was more closely related but the reasoning for this

is not clear, as PI is an integral part of all the TEAM styles reported as being in frequent use.

A key issue will be how the epidemiological data which will be collected as a result of the inclusion of PI in ICD 11 will be interpreted and used. This move by WHO has been criticised by those who believe that WHO promotes unscientific TCM and that it reflects a 'lapse in evidence-based thinking and practice' and 'a threat to conservation', 'lack of rigorous testing' and that TCM diagnostic codes are imaginary. This study demonstrates that PI is used extensively in acupuncture practice in the 5 countries surveyed but further research is required on its effectiveness.

4.1. Study limitations

The response rates to the survey were lower than expected, however, poor response rates to participating in electronic web based surveys is not restricted to TEAM, it is a major concern for all researchers hoping to access large numbers of responses [25]. Responses will depend on the perceived benefits to the participants, as well as other factors.

The survey provides a snapshot of TEAM practice but is unlikely to be representative as the samples were small relative to the number of TEAM practitioners worldwide and as such could be biased. It was problematic accessing robust international representative populations of TEAM practitioners due to both ensuring that a key contact or local champion could be identified and secondly was able to disseminate the electronic survey. Although the UK and Australian samples were gathered through those countries' main TEAM professional bodies those in Italy and Korea were accessed each via one particular organisation that may not have been generally representative and the completion of the survey by practitioners was voluntary.

The Korean sample may not have been representative as it was accessed through their preventative medicine society that may not faithfully reflect the views of practitioners in the various other specialist groups in the country. As already discussed, the Chinese sample was too haphazard to be sure who it represented and a far more comprehensive and larger survey is required.

Further variation may have been introduced by the survey having been carried out at different times over a 2 year period depending on the country and the need to translate into different languages. In addition the concept of TEAM and use thereof was unpopular with Chinese participants and may have affected response rates. Designing the survey and ensuring accurate translations into the appropriate language was additionally problematic as some terms may have been misunderstood. The survey itself may have asked too many complex questions, with respondents taking between 15–60 min to complete. Survey fatigue may have affected the completion rate. The length of time after clicking the SurveyMonkey link and completing the questionnaire ranged between less one second and 44 minutes. As a result there was data loss and analyses could only take place on completed questionnaires. However, this opportunistic practitioner sampling constitutes an important drawback, as the study does not bring information about PI in such major TEAM usage countries as China, Japan, the USA and several European countries. This preliminary survey is problematic in that no meaningful comparisons can be drawn between countries in Asia, or East versus West. Nonetheless this research brings forth some valuable data, and we can only hope that more research emerges which will in turn help to position these findings within a larger global context.

4.2. Further research

Many further questions arise from these results, explaining anomalous answers (e.g. the tongue and pulse data from Korea), to extend the answers (e.g. what circumstances favour PI use for those practitioners that do not use it all the time?) or to fill in additional areas that were not covered originally (for example, what are perceptions about 'How well PI was taught' and 'How might PI education be improved'? 'Do practitioners experience any particular problems with using diagnostic methods and identifying the patterns?' 'How do practitioners make use of PI in determining treatment principles' and How are such details used in treatment?).

The authors hope that future studies could achieve larger and more representative geographical samples. The use of other research methods including observational, qualitative and big data analysis would give a more accurate, broader and more informative picture of the use of pattern identification both in education, clinical practice and research. This in turn may optimise clinical trial outcomes by more accurately mimicking diagnosis and treatment in clinical practice.

Declaration of Competing Interests

The authors declare they have no conflict of interests.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.eujim.2019.100997.

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