Research of simple medical service quality index system: Based on decision-making model

Yingying Zang  
Beijing University of Chinese Medicine

Peng Li  
Beijing University of Chinese Medicine

Taotao Lv  
Beijing University of Chinese Medicine

Jingyun Yuan  
Beijing University of Chinese Medicine

Zhaoyang Wang  
Beijing University of Chinese Medicine

Qingguo Liu (✉ liuqingguo888@vip.sina.com)  
Beijing University of Chinese Medicine

Research Article

**Keywords:** Keywords quality, medical service, patient safety

**Posted Date:** December 3rd, 2021

**DOI:** https://doi.org/10.21203/rs.3.rs-1065957/v1

**License:** © This work is licensed under a Creative Commons Attribution 4.0 International License.  Read Full License
Abstract

Background

There are many private Chinese Medicine (CM) clinics in Europe, America, and other countries to choose from, but for physicians and patients, the quality of the clinic's services is difficult to determine. Physicians provide access to CM therapies due to the increasing number of patients receiving treatment within the National Health System (NHS). However, it has become a challenge for both physicians and patients to determine the competence of those who provide CM therapies. Therefore, it is necessary to develop a simple and applicable evaluation list for assessing alternative providers.

Aim

Through the consensus of experts, a rapid decision-making scale for the quality of CM clinics is developed for use by physicians or patients.

Methods

Donabedian evaluation framework was used to design the consultation questionnaire. The indicators were designed based on the evaluation ratings of CM and the opinions of acupuncture experts in China and overseas. Delphi Method was used to seek the opinions anonymously. A pairwise comparison matrix was constructed after two rounds of expert consultation, and the weight of each indicator was calculated.

Results

The top three weightings in the secondary indicators were the doctor-patient relationship, the number of dominant diseases, and medical records. Besides, the three highest weightings in the technical level included the number of technical projects conducted in clinics, the number of dominant diseases, and the degree of perfection of medical records. The highest weighted items in the treatment ability included the treatment effect of general diseases and the efficiency of disease treatment and treatment of general diseases. In service quality, the incidence of hospital infection and adverse events were the highest weighted items.

Conclusion

It is possible to focus on the choice of therapy providers for internists and patients based on the weightings of each entry. Technical skills, competence, and quality of service are the key factors to consider when choosing a therapy provider based on specific points in each item.

Introduction

CM is commonly used in the general population.\textsuperscript{[1-3]} To date, CM data with the highest representative samples have been obtained in England. The data indicated that the lifetime and 12-month prevalence of CM use in England is 44% and 26%, respectively.\textsuperscript{[4]} Acupuncture is the most used CM in over 180 countries and territories worldwide (about 120 million people).\textsuperscript{[5, 6]} According to the UK Department of Health, at least 86% of chronic pain clinics in the NHS offer acupuncture treatment services. This trend is consistent with the current NHS emphasis on efficacy reliability and cost-effectiveness.

Therefore, it is unknown whether patients receive reliable therapies when physicians refer them to those engaged in CM therapies.\textsuperscript{[7-9]} For instance, there is a high risk of direct harm to the patient when acupuncture is used. This could result
from the invasiveness of the treatment or due to misdiagnosis and oversight of the treatment plan. Such situations may arise due to inadequate knowledge or information about the availability of CM practitioners, insufficient guidelines for evaluating needles, etc.\(^{10,11}\) Most physicians prefer CM practitioners who are professionally registered. However, professional registration alone does not reflect the full range of clinical care available.\(^{12}\) Herein, acupuncture was used to establish a practical and rapid evaluation system to help physicians and patients select appropriate CM practitioners.

In China, there are strict regulations on the service quality control of CM, and the relevant departments have formulated many norms based on scientific practice and expert consensus. However, CM has its development model in various countries. In Europe, America and other countries, the use of Chinese medicine is mostly in small private clinics, and complicated service quality management regulations are difficult to apply. This study selected experts with both Chinese and overseas practice experience to construct an evaluation system via the Analytic hierarchy process (AHP) method.\(^{13–15}\) This study aimed to determine the selection criteria for the patients and physicians in choosing CM practitioners and the priority ranking of these criteria using the AHP method. This is a decision list applicable to all levels of CM clinics, which may also serve as a guide for CM practitioners to assess their clinical competencies.

**Method**

**Establishment of an expert advisory group**

The Delphi Method was used to construct an index system for evaluating the competence of clinical specialties.\(^{16}\) The questionnaire was given to 30 experts from official CM centers overseas since they had experience in China and overseas. All methods were carried out in accordance with relevant guidelines and regulations. The participating experts all agreed that the results of their questionnaires were used for research. The ethical approval was given by the Beijing University of Chinese Medicine Ethics Committee for Non-Interventional Studies. All methods were carried out in accordance with relevant guidelines and regulations.

**Designing of evaluation indicators**

The indicators were designed based on the standard of CM Medical institutions and the opinions of expert advisory groups. It includes *World standard of Establishment and service of CM(Incl. Acupuncture) Clinic*\(^{17}\), *Department of State Health Standards for Public Health Clinic Services*\(^{18}\) and the *Guidelines for Prevention and Control of Medical Technology-Related Infections in Chinese Medicine*.\(^{19}\) The experts added other indicators based on practical experience. Standards of CM Medical institutions are an objective and reliable reference for evaluating the degree of service capability of CM practitioners.

The design framework used the classic Donabedian evaluation framework in health care and was based on three dimensions: structure, process, and results.\(^{20}\) Structure indicates the supply factors that influence healthcare services and the allocation of various resources. The process shows the various activities of healthcare services, which are essential in the output of various resources. Outcome is the output of healthcare services, reflecting the impact of healthcare services on patients. The decision system was simple, oriented, and practical. The decision list can also help physicians and patients to quickly assess the professionalism and safety of a CM clinic or practitioner to decide whether or not to receive treatment.

**Two rounds of expert consultation**

The indicators were developed into an expert consultation form and given to each expert to score each evaluation indicator based on importance. Two rounds of expert consultation were conducted. The first round provided background information and scoring of the indicators. The research team counted the returned consultation forms after the first
round for the second round. The first round results were used in the second round to assess the indicators with different opinions and had suggestions for revision. The indicators were then scored.

**Building of AHP hierarchical model**

The AHP hierarchical model was divided into three levels of indicators and three evaluation perspectives based on the Donabedian evaluation framework (Fig. 1).

**Construction of a comparison matrix**

The average of the scores assigned to each indicator by each expert was obtained based on second expert consultation results. The differences among the average scores assigned to each indicator were converted to the corresponding Satty relative importance level (Table 1).

| Scale | Difference between the significance assignment and the meaning | Implication |
|-------|-------------------------------------------------------------|-------------|
| 1     | 0.00                                                        | Both elements are equally important |
| 3     | 0.25<Z≤0.50                                                 | The former is slightly more important than the latter |
| 5     | 0.75<Z≤1.00                                                 | The former is significantly more important than the latter |
| 7     | 1.25<2≤1.50                                                 | The former is significantly more important than the latter |
| 9     | Z>1.75                                                     | The former is more important than the latter |
| 2,4,6,8 | /                                                          | Indicates the middle value of the above judgments |

A pairwise comparative judgment matrix was constructed within the same indicator layer using a two-by-two comparison of the importance of each proportional scale. For instance, in matrix $A$, $A$ is the comparison matrix of size $n \times n$, where $n$ is the criteria (priority matrix) (Fig. 2). Yaahp7.5 software was used to calculate the weights of each indicator based on the results of the judgment matrix.

**The degree of expert coordination test**

The degree of expert coordination was expressed as the Kendall coordination coefficient ($W$), which reflects the difference in the opinions of the experts on the evaluation of the indicators. $W$ is a value between 0 and 1, where a higher $W$ indicates a higher degree of agreement among the experts. $W$ was subjected to statistical $X^2$ to verify the reliability of the results. Statistical significance was set at $P < 0.05$.

**Hierarchical single ranking and consistency test**

Inconsistent judgments may occur during the construction of the judgment matrix. Therefore, the consistency of the judgment matrix should be tested and expressed via the consistency ratio (CR). The consistency test meets the requirements when CR<0.1.

**Data processing**
SPSS 20.0 statistical software was used for descriptive analysis and to conduct Kendall's coefficient of coordination test. The Yaahp 10.0 software was used for the weights and consistency tests.

**Patient and public participation statement**

This study adopted the method of expert consultation, during which no public and patients were included in the study.

**Result**

**Response rate and basic information about the experts**

We invited 30 experts to take part in the questionnaire and 26 of them completed two rounds. The basic information about the experts is shown in Table 2. The Kendall coordination coefficient was 0.52 for the first round ($P \leq 0.05$) and 0.501 for the second round ($P \leq 0.05$) (Table 3).

| Characteristic | Frequency |
|----------------|-----------|
| **Age**        |           |
| 30 and below   | 7         |
| 30~50          | 13        |
| 50~70          | 5         |
| 70 and above   | 1         |
| **Gender**     |           |
| Man            | 11        |
| Woman          | 15        |
| **Education**  |           |
| Bachelor       | 12        |
| Master         | 8         |
| PhD            | 6         |
| **Country**    |           |
| America        | 3         |
| Australia      | 2         |
| Canada         | 2         |
| Malaysia       | 2         |
| Russia         | 10        |
| China          | 7         |

Table 2

| The demographic characteristics of participants of the focus group | Characteristic | Frequency |
|-------------------------------------------------------------------|----------------|-----------|
| **Age**                                                           |                |           |
| 30 and below                                                     | 7              |
| 30~50                                                             | 13             |
| 50~70                                                             | 5              |
| 70 and above                                                     | 1              |
| **Gender**                                                       |                |           |
| Man                                                               | 11             |
| Woman                                                             | 15             |
| **Education**                                                    |                |           |
| Bachelor                                                          | 12             |
| Master                                                            | 8              |
| PhD                                                               | 6              |
| **Country**                                                      |                |           |
| America                                                           | 3              |
| Australia                                                        | 2              |
| Canada                                                            | 2              |
| Malaysia                                                          | 2              |
| Russia                                                            | 10             |
| China                                                             | 7              |
Table 3 Kendall’s Coordination Coefficient and Significance Test

|                        | Kendall’s Coordination Coefficient | $\chi^2$  | P-value |
|------------------------|------------------------------------|-----------|---------|
| First round            | 0.520                              | 169.062   | $<$0.001|
| Second round           | 0.501                              | 162.846   | $<$0.001|

**Scoring results and weights**

Two rounds of questionnaire evaluation were conducted. The mean of all scores was above 3.5 in the first round. There were slight changes in the scores in the second round compared with the scores in the first round. However, the scores of each indicator in the second round were above 3.5. No experts suggested ‘adding’ or ‘deleting’ indicators in both rounds. The scores in the second round were used (Table 4).
A two-by-two comparison judgment matrix was constructed based on the results of the second expert consultation (Table 5,6). The results showed that each layer of the judgment matrix passed the consistency test, indicating a reliable indicator system.
### Table 5 Matrix and Weight (third order matrix)

|                                     | Structural service capabilities | Process service capability | Outcome service capability | Weight (\(\omega\)) | consistency test(CR) |
|-------------------------------------|---------------------------------|----------------------------|----------------------------|-----------------------|-----------------------|
| Structural service capabilities     | 1                               | 1/5                        | 1/4                        | 0.1                   | CR=0.078\(\cdot\) 0.1 |
| Process service capability         | 5                               | 1                          | 3                          | 0.61                  |                       |
| Outcome service capability          | 4                               | 1/3                        | 1                          | 0.28                  |                       |

|                                     | Medical treatment capacity      | Medical service quality    | Medical technology level   |                         |                       |
|-------------------------------------|---------------------------------|----------------------------|---------------------------|-----------------------|-----------------------|
| Medical treatment capacity          | 1                               | 2                          | 1/2                       | 0.31                  | CR=0.095\(\cdot\) 0.1 |
| Medical service quality             | 1/2                             | 1                          | 1/2                       | 0.2                   |                       |
| Medical technology level            | 2                               | 2                          | 1                         | 0.49                  |                       |

|                                     | Number of hospital beds         | Number of medical equipment| Medical environment       |                         |                       |
|-------------------------------------|---------------------------------|----------------------------|---------------------------|-----------------------|-----------------------|
| Number of hospital beds             | 1                               | 2                          | 1/3                       | 0.35                  | CR=0.30\(\cdot\) 0.1  |
| Number of medical equipment         | 1/2                             | 1                          | 1/4                       | 0.19                  |                       |
| Medical environment                 | 1/3                             | 4                          | 1                         | 0.46                  |                       |

|                                     | Number of technical projects carried out | The number of dominant diseases | Medical records | \(\omega\) |
|-------------------------------------|--------------------------------------------|---------------------------------|-----------------|-----------|
| Number of technical projects carried out | 1                                          | 1/4                             | 1/4             | 0.11     | CR=0.04\(\cdot\) 0.1 |
| The number of dominant diseases     | 4                                          | 1                               | 2               | 0.54     |                       |
| Medical records                     | 4                                          | 1/2                             | 1               | 0.34     |                       |

### Table 6 Matrix and Weight (sixth order matrix)
The weights of each indicator were then calculated. The structural, process, and outcome service competencies required by alternative therapy clinics or therapists were 0.0962, 0.6193, and 0.2842, respectively. The top three weightings in the secondary indicators were doctor’s technical level, patient satisfaction, and treatment competence. The three highest weightings in the technical level included the number of technical items conducted in clinical practice, the number of superior diseases, and the degree of perfection of treatment records. The highest weighting in the treatment capability was the effectiveness of treating general diseases. The two highest weightings in the service quality included the incidence of hospital infections and adverse events. Finally, the weights of the three layers of indicators were homogenized (Table 7).
Table 7
Comprehensive Weightings of Medical service capability

| Weight of first-level indicators ($\omega$) | Weight of second-level indicators ($\omega$) | Weight of third-level indicators ($\omega$) |
|-------------------------------------------|--------------------------------------------|-------------------------------------------|
| Process service capability (0.6194)       | Medical technology level (0.3035)           | The number of dominant diseases (0.1640)  |
|                                           |                                            | Medical records (0.1033)                   |
|                                           |                                            | Number of technical projects conducted (0.0334) |
| Medical treatment capacity (0.1919)       | Treatment effect of common diseases (0.0443) |                                           |
|                                           | Effective rates of the overall diseases (0.0443) |                                           |
|                                           | The effective rates of common ailments (0.0441) |                                           |
|                                           | Treatment effects of complex diseases (0.0231) |                                           |
|                                           | Effective rates of complex diseases (0.0211) |                                           |
|                                           | Number of annual outpatients (0.0135)       |                                           |
| Medical service quality (0.1223)          | Number of adverse events (0.0929)           |                                           |
|                                           | Control of hospital infection (0.0310)      |                                           |
| Outcome service capability (0.2842)       | Doctor-patient relationship (0.2274)        | Doctor-patient relationship (0.2274)      |
|                                           | Medical costs (0.0947)                      | Medical expenses (0.0188)                 |
|                                           |                                           | Use of medical insurance (0.0381)         |
| Structural service capabilities (0.0962)  | Configuration and composition of the       | Medical environment (0.0444)              |
|                                           | department (0.0962)                        |                                           |
|                                           |                                           | Number of hospital beds (0.0334)          |
|                                           |                                           | Number of medical equipment (0.0184)      |

The first level of indicators was used in the application, with the highest weighted items needing to be considered in the judgment, and the second and third level indicators were specific refinements. Clinics or doctors are competent if they meet more indicators based on their weights. Finally, the third-level indicators were ranked based on their weights, producing a list of decision considerations (Fig. 3).

**Use of the decision list**

The use of these indicators is usually based on comparisons among candidate clinics or therapists. Such as "The number of dominant diseases", which CM practitioners can treat more dominant diseases means it is ahead of others in
this respect. As far as the medical treatment capacity is concerned, if the curative effect cannot be expected, it will lose the meaning of the physician or patient to choose a referral. According to research, the effective rate of dominant diseases should be more than 60%, and the effective rate of complex diseases should be more than 50%.[21–22]

Physicians or patients can use this decision list to inquire or inspect candidate clinics or therapists in a targeted manner. Highly weighted indicators represent the need to be considered in decision-making. For candidate clinics, the more indicators in the list can be met, the better the service quality. In terms of actual operation, physicians or patients can add the weight values of items satisfied by the candidate clinic. The higher the value, the better the quality of medical services it can provide. Based on consensus, this list is applicable to CM diagnosis and treatment institutions of different levels and scales. It brings together the most core and necessary norms of CM diagnosis and treatment services. The specific content and explanation of each item are shown in Table 8.
| Indicators (ω)                                                                 | Explanation                                                                                                                                                                                                 |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The number of dominant diseases (0.1640)                                     | The CM practitioner in the clinic should be expert in treating more than three dominant diseases. The more types of diseases that CM practitioner can treat, the better their diagnosis and treatment capabilities. |
| Medical records (0.1033)                                                     | The CM practitioner should complete the patient's medical records in full and detailed, and there should be a fixed place for the preservation of medical records in the clinic where they are located.                              |
| Number of technical projects conducted (0.0334)                              | The CM practitioner in the clinic should be expert in using more than one technical projects. The more types of technical projects that CM practitioner can use, the better their diagnosis and treatment capabilities. |
| Treatment effect of common diseases (0.0443)                                 | The effective rate of common diseases should be above 80%, cure rate should be above 60%.                                                                                                                                 |
| Effective rates of the overall diseases (0.0443)                             | Effective rates of the overall diseases should be above 60%.                                                                                                                                               |
| The effective rates of common ailments (0.0441)                              | The effective rates of common ailments should be above 60%.                                                                                                                                                 |
| Treatment effects of complex diseases (0.0231)                               | The patient's subjective feeling has improved significantly and is willing to continue treatment.                                                                                                               |
| Effective rates of complex diseases (0.0211)                                 | Effective rates of complex diseases should be above 50%.                                                                                                                                                   |
| Number of annual outpatients (0.0135)                                        | It is used for comparison among candidate clinics. The larger the number, the better the service quality.                                                                                                    |
| Number of adverse events (0.0929)                                            | Number of adverse events should be controlled within 3 times a year.                                                                                                                                          |
| Control of hospital infection (0.0310)                                       | CM medical clinics should have measures to control hospital infections.                                                                                                                                    |
| Doctor-patient relationship (0.2274)                                         | The CM practitioner should have good professional ethics and professionalism.                                                                                                                                |
| Medical expenses (0.0188)                                                    | The medical expenses of the CM medical clinics should be reasonably priced.                                                                                                                                  |
| Use of medical insurance (0.0381)                                           | The use of medical insurance can reduce the burden of patients' expenses.                                                                                                                                     |
| Medical environment (0.0444)                                                 | The medical environment should be clean and tidy, and environmental sanitation standards should comply with local legal requirements.                                                                           |
| Number of hospital beds (0.0334)                                            | It is used for comparison among candidate clinics. The larger the number, the better the service quality.                                                                                                    |
| Number of medical equipment (0.0184)                                         |                                                                                                                                                                                                            |
Discussion

Previous studies have revealed poor communication between physicians and their patients’ acupuncturists, with only a few physicians maintaining effective communication. This situation arises because there is no specific advice to guide physicians on selecting and maintaining contact with their acupuncturists.[23] The poor communication results in lost opportunities to exchange patient history and treatment procedures and inform each other of possible side effects.[22–24] Moreover, it can affect the service quality control of CM.

Service quality assessment of CM treatment has been a concern for health care quality regulators in various countries. The existing overly detailed quality regulation entries may not help internists or patients to determine the best CM clinic or practitioner. Besides, it is difficult to determine the most important evaluation points since most people do not understand CM treatment.[27, 28] The list of decision points established via the AHP method was used to assess the importance of each index through expert consultation. The indices were then ranked based on their weightings, thus establishing a concise, practical, and directional list for rapid assessment.[29, 30]

The decision list can be practically used under two different situations to help determine the CM practitioner’s competence; where the therapist is legally registered and where the CM practitioner is not legally registered. Moreover, most internists or patients do not know of CM, making them unable to choose a good CM therapy. However, they only need to assess the CM practitioner’s daily technical level, treatment ability, and quality of service since those are the indicators of the actual ability of the CM practitioner.

Herein, process service competencies, including therapist technical level, treatment competencies, and service quality, dominated the evaluation list. Therefore, the process is essential for the therapist to provide quality treatment. The three highest weightings of the technical level included the number of technical programs conducted in the clinic, the number of superior diseases, and the degree of perfection of treatment records. The technical level shows whether the alternative therapist has sufficient technical means to cope with different diseases and whether the treatment process is standardized. However, there may be a situation where the alternative therapist has significant knowledge only on a specific disease, which is rare. The effectiveness of treatment is a major concern here. The doctor-patient relationship is an important aspect of the consultation and treatment process. It is also necessary to consider the quality of service, such as the incidence of in-hospital infections and adverse events, which can increase the assurance of avoiding unexpected situations during the treatment process. Therefore, internal medicine physicians or patients can use the quick judgment list to make discretionary judgments and choices based on the weightings.

Conclusion

This list mainly helps to address the CM service quality control system based on providing quality care to patients, thus reducing the time and expenses. Therefore, the decision list can be used to choose a clinic or therapist. The evaluation system can also help a therapist make worthwhile investments in operation and management for effective medical care.

Limitations

This study only provided a list of recommendations to help make a quick judgment and does not provide a complete evaluation of all aspects of a clinician or practitioner. The data in this study only refer to the actual situation of CM in five countries, including the United States, Australia, Russia, Canada, and Malaysia, each of which has a unique situation. Therefore, it cannot be fully tailored to the actual situation of each country. However, the situation in the five
countries is the same based on the results. The problems faced by the similarities, internal medicine doctors, and patients’ demands should be used to maximize the improvement of the condition. Therefore, this study provides a basis for assessing and developing a priority list that can help patients choose the right doctor in a specific country and for a specific disease.

Besides, the decision list was not immediately tested and requires actual use and test in actual clinical work in the future. This study can help where little understanding of Chinese medicine (acupuncture) exists, but patients desire alternative therapies. However, follow-up studies should be conducted at the level of cost-to-effectiveness ratio and patient satisfaction. Finally, the study is beneficial to clinics or institutions that want to improve their service quality further.

Abbreviations

| Full name                  | Abbreviation |
|----------------------------|--------------|
| Chinese Medicine           | CM           |
| National Health System     | NHS          |
| Analytic hierarchy process | AHP          |

Declarations

Ethics approval and consent to participate
The ethical approval was given by the Beijing University of Chinese Medicine Ethics Committee for Non-Interventional Studies. All methods were performed in accordance with the Declaration of Helsinki. All experts had to give written informed consent for participation.

Consent for publication
Not Applicable.

Availability of data and materials
The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests
No competing interests.

Fundings
This study was funded by National Natural Science Foundation of China (No.82074553).

Authors’ contributions
Concept and design of the study: all authors. Data collection: Yingying Zang, Peng Li. Analysis and interpretation of data: Ying-ying Zang, TaoTao Lv, Jingyun Yuan. Drafting of the manuscript: Yingying Zang. Critical revision of the manuscript: all authors. Guarantor of the study: Qing-guo Liu, Zhaoyang Wang.

Acknowledgements
We would like to thank all the participants in our study and the members of the advisory committee for their time and effort. We thank the expert advisory group members for their support and assistance with this study.
References

1. British Medical Association. Acupuncture: Safety, Efficacy and Practice. London: Harwood Academic Publishers, 2000: 1-4.

2. Mbizo J, Okafor A, Sutton MA, et al. Complementary and alternative medicine use among persons with multiple chronic conditions: results from the 2012 National Health Interview Survey. BMC Complement Altern Med. 2018; 18(1): 281-93.

3. Krug K, Kraus KI, Herrmann K, Joos S. Complementary and alternative medicine (CAM) as part of primary health care in Germany—comparison of patients consulting general practitioners and CAM practitioners: a cross-sectional study. BMC Complement Altern Med. 2016; 16(1): 409-17.

4. Liu L, Tang Y, Baxter GD, Yin H, Tumilty S. Complementary and alternative medicine - practice, attitudes, and knowledge among healthcare professionals in New Zealand: an integrative review. BMC Complement Med Ther. 2021; 21(1): 63.

5. Nguyen J, Smith L, Hunter J, Harnett JE. Conventional and Complementary Medicine Health Care Practitioners’ Perspectives on Interprofessional Communication: A Qualitative Rapid Review. Medicina (Kaunas). 2019; 55(10): 650.

6. World Health Organization. General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine. Geneva, Swiss Confederation: World Health Organization 2000: 3-8.

7. Busse JW, Pallapothu S, Vinh B, Lee V, Abril L, Canga A, et al. Attitudes towards chiropractic: a repeated cross-sectional survey of Canadian family physicians. BMC Fam Pract. 2021; 22(1): 188.

8. Stussman BJ, Nahin RR, Barnes PM, Ward BW. U.S. Physician Recommendations to Their Patients About the Use of Complementary Health Approaches. J Altern Complement Med. 2020; 26(1): 25-33.

9. Mayberry JF. Review: Statutory regulation of invasive complementary therapies, such as hijama and acupuncture, is the only effective way of ensuring both patient safety and good practice. Med Leg J. 2018; 86(1): 23-31.

10. Ung COL, Harnett J, Hu H. Key stakeholder perspectives on the barriers and solutions to pharmacy practice towards complementary medicines: an Australian experience. BMC Complement Altern Med. 2017; 17: 394-411.

11. Engelman DT, Hamdan AD, Boyle EM Jr. Commentary: Quality metrics are important, but we must also become stewards of health care value. J Thorac Cardiovasc Surg. 2021; 162(3): 889-891.

12. Posadzki P, Watson LK, Alotaibi A, Ernst E. Prevalence of use of complementary and alternative medicine (CAM) by patients/consumers in the UK: systematic review of surveys. Clin Med (Lond). 2013; 13(2): 126-131.

13. Saaty TL. The analytic hierarchy process. Pittsburg, PA, USA: RWS Publication, 1990: 3-36.

14. Saaty TL. How to make a decision the analytic hierarchy process. Interfaces. 1994; 24(6): 19-43.

15. Saaty TL. Decision making with the analytic hierarchy process. Int J Services Sciences. 2008; 1(1): 83-98.

16. Hasson F, Keeney S, McKenna H. Research guidelines for the Delphi survey technique. J Adv Nurs. 2000; 32: 1008-15.

17. World Federation of Chinese Medicine Societies. World Standard of Establishment and Service of CM (Incl. Acupuncture) Clinic. http://en.wfcms.org/Englishpage/NoPicdetails.jsp?id=3764 (accessed 20, Jun, 2014)

18. Standard for Health Promotion in Hospital, WHO European Office for Integrated Health Care Service, 2004. https://(20, Jan, 2014)

19. State Administration of Traditional Chinese Medicine. Guidelines for Prevention and Control of Medical Technology-Related Infections in Chinese Medicine. http://.html(24, Mar, 2018)

20. Ayanian JZ, Markel H. Donabedian’s Lasting Framework for Health Care Quality. N Engl J Med. 2016; 375.205-7.
21. Department of Medical Administration of the State Administration of Traditional Chinese Medicine. TCM diagnosis and treatment plans for 105 diseases in 24 specialties. Beijing, China: China Traditional Chinese Medicine Press, 2018.

22. Department of Medical Administration of the State Administration of Traditional Chinese Medicine. Diagnosis and treatment plans for 95 dominant TCM diseases. Beijing, China: China Traditional Chinese Medicine Press, 2018.

23. Aveni E, Bauer B, Ramelet AS, Decosterd I, Ballabeni P, Bonvin E, et al. Healthcare professionals' sources of knowledge of complementary medicine in an academic center. PLoS One. 2017;12(9):e0184979.

24. Sirois FM, Riess H, Upchurch DM. Implicit Reasons for Disclosure of the Use of Complementary Health Approaches (CHA): a Consumer Commitment Perspective. Ann Behav Med. 2017;51(5):764-774.

25. Aveni E, Bauer B, Ramelet AS, Kottelat Y, Decosterd I, Finti G, et al. The Attitudes of Physicians, Nurses, Physical Therapists, and Midwives Toward Complementary Medicine for Chronic Pain: A Survey at an Academic Hospital. Explore (NY). 2016;12(5):341-346.

26. Aveni E, Bauer B, Ramelet AS, Decosterd I, Ballabeni P, Bonvin E, et al. Healthcare professionals' sources of knowledge of complementary medicine in an academic center. PLoS One. 2017;12(9):e0184979.

27. Salamonsen A, Wiesener S. "Then I went to a hospital abroad": acknowledging implications of stakeholders' differing risk understandings related to use of complementary and alternative medicine in European health care contexts. BMC Complement Altern Med. 2019;19:93-104.

28. Burstin H, Leatherman S, Goldmann D. The evolution of healthcare quality measurement in the United States. J Intern Med. 2016;279:154-9.

29. Boulkedid R, Abdoul H, Loustau M, Sibony O, Alberti C. Using and reporting the Delphi method for selecting healthcare quality indicators: a systematic review. PLoS One. 2011;6:e20476-85.

30. Dolan JG. Shared decision-making--transferring research into practice: the Analytic Hierarchy Process (AHP). Patient Educ Couns. 2008;73:418-25.

Figures

![Hierarchical model]

Figure 1

Hierarchical model
Figure 2

Matrix of paired comparisons

\[ A = \begin{bmatrix}
1 & a_{12} & \ldots & a_{1n} \\
\alpha_{21} & 1 & \ldots & a_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
\alpha_{n1} & \alpha_{n2} & \ldots & 1
\end{bmatrix} \]
Figure 3

List of decision considerations