

Exploration of Factors Influencing Traditional Chinese Medicine Doctor's Competency Using Structural Equation Model

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Abstract

Background Traditional Chinese medicine doctors have traditional advantages in the treatment of non-disease, basic medical treatment, chronic disease treatment, health care and rehabilitation. This research is to find the competency of TCM doctor using structural equation model and help to select proper candidate of TCM doctor.

Results Based on the items extracted from competency theory, the data of 400 TCM doctors in Hangzhou, Guangzhou and Wuhan were identified by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). On this basis, the interaction among the factors is analyzed, and the competency model is established by using the structural equation model (SEM). A total of 21 projects were identified as critical to TCM doctor capability, which were further tested and attributed to five factors: (1) professional value attitude; (2) basic medical knowledge; (3) communication skills; (4) clinical skills; (5) information management. The subsequent analysis shows that all factors have a significant impact on a person's ability, and ability contributes the most to the formation of a person's ability, while the intermediary role of personal characteristics and thinking can not be ignored in theory or practice. The results show that the competency model composed of these three factors has the same structure as the classic competency model.

Conclusion This study presented a tentative approach for assessing clinical management assistant's competency, as well as emphasized to the managers the criteria to find and evaluate a TCM doctor.

Introduction

Traditional Chinese medicine carries the experience and theoretical knowledge of ancient Chinese people in fighting against diseases. As a treasure of the Chinese nation, traditional Chinese medicine plays an active role in disease prevention and treatment[1, 2]. Traditional Chinese medicine has unique advantages in the field of modern medical treatment due to its low cost, small side effects and personalized diagnosis and treatment. Traditional Chinese medicine plays an irreplaceable role in China's medical and health undertakings[3, 4].

Traditional Chinese medicine (TCM) doctors have traditional advantages in preventive treatment, basic medical treatment, chronic disease treatment, health care and rehabilitation. The thought of preventive treatment of disease is an important part of the theory of traditional Chinese medicine[5]. Traditional Chinese medicine emphasizes prevention before disease, prevention of change after disease, prevention and recovery after disease, which is consistent with the three-level prevention of modern medicine[6]. In terms of basic medical treatment, traditional Chinese medicine can effectively treat most common diseases, and the natural properties of traditional Chinese medicine can effectively avoid drug resistance and other side effects brought by modern medicine[7]. In the treatment of chronic diseases, the application of TCM special therapy and the promotion of TCM appropriate technology provide a broad

space for TCM doctors. In the aspect of health care and rehabilitation, traditional Chinese medicine pays attention to health care, which emphasizes the balance of yin and Yang[8].

The theoretical source of competency evaluation is the empirical research on competency from psychology. With the development of psychology, competency is gradually combined with the post of traditional Chinese medicine[9]. At the same time, traditional Chinese medicine also gradually pays attention to the examination of internal core competencies, emphasizing that staff should be able to meet the relevant requirements of their posts[10].

Structural equation model (SEM) can study both observable variables and variables that cannot be directly observed. It can not only study the direct effect between variables, but also study the indirect effect between variables, and show the relationship between variables intuitively through the path diagram; through the structural equation model, researchers can construct the relationship between hidden variables, and verify whether the structural relationship is reasonable[11].

In our research, we take competency theory into application to analyze the TCM doctors using SEM. The factors required for TCM doctors can be evaluated through SEM model. So, how much the effects of identified factors contribute to TCM doctors's competency can be evaluated and standard of a proper candidate of TCM doctor can be explored.

Methods And Materials

By collecting relevant literature, expert consultation, expert questionnaire collection, and interviews with traditional Chinese medicine doctors, a competency model of Chinese medicine doctors in Chinese medicine hospitals is constructed. Select several Chinese medicine hospitals as the sample area, and conduct a questionnaire survey of Chinese medicine doctors. The content mainly includes the scores of the competence factors of Chinese medicine practitioners. Through data analysis and sorting, we verified the competency model of traditional Chinese medicine practitioners. Methods: we used the internal consistency reliability test methods, principal component analysis, and discriminant validity test of competency factors.[12].

Questionnaire Survey

Subsequently, a small sample of pilot tests was conducted and revised on the survey subjects, and then a large-scale survey was launched. Collect potential items of competency from different sources, conduct formal questionnaire surveys, and then conduct large-scale questionnaire surveys to obtain the views of Chinese medicine practitioners on these items.

Pilot Survey

To compile the questionnaire for the professional identity of traditional Chinese medicine physicians, the researchers adopted the following steps: a) Generate items through systematic literature review and group discussion; B) Preliminarily select scale items through theoretical analysis and expert review to determine the validity and validity Content validity; C) data collection, using pilot questionnaires to investigate psychometric characteristics; D) project derivation and factor extraction; E) internal consistency test; validity and reliability test.

Large-Scale Survey

Before designing the questionnaire, by comparing the core connotation of each item, according to the definition and critical actions described in the general competence dictionary, screening and summarizing all items measured in the pilot survey[13].

From March to May 2019, a cross-sectional survey of key insiders was conducted in a convenient sample of traditional Chinese medicine doctors in Chinese hospitals.

Factor Analysis

Project analysis and exploratory factor analysis were carried out on 400 self-filled questionnaires from 4 Chinese medicine hospitals. To complete this study, we performed explanatory factor analysis (EFA) and confirmatory factor analysis (CFA)[14].

For each potential structure, multiple separate scales or indicators will be used to create a measurement model based on confirmatory factor analysis using SEM technology [15]. The focus of the measurement model is how to conceptualize and measure explicit variables. The results show that factor analysis provides a reliable tool for revealing the structure of measurement indicators, especially when there is insufficient prior knowledge about the factors or patterns of measurement indicators.

Modeling of Competency for clinical department's operations management assistant

The structural equation model (SEM) based on robust maximum likelihood estimation considers the complex relationship between variables and performs regression analysis on observation (measured or explicit) data, and at the same time performs factor analysis on latent variables. Use structural equation modeling (SEM) to conduct multivariate analysis to determine the structural validity of potential factors affecting professional competence [16].

The structural equation model includes two sub-models: 1) the measurement model that maps the observed data to the hypothetical potential factors (that is, confirmatory factor analysis), allowing direct calculation of measurement errors and estimation of the reliable value of the relevant structure; (2) the

structural model, indicating The regression relationship between measured variables, including latent variables and observed variables.

Finally, we found the critical influence path between potential factors and professional competence through the goodness of fit test of the model. The competency model of traditional Chinese medicine physicians was established.

Structural equation modeling provides a valuable means to conduct theory-driven research and compare multiple perspectives in a single model. In other words, in addition to meeting statistical standards, to explain the relationships found in the SEM process from a practical standpoint, we must also follow the previous theory. This issue has been considered and reflected in the model modification process described in the following chapters.

Survey Samples

The four major cities have carried out large-scale subway construction to collect relevant information, which provides a good source of information for our investigation. In the four surveyed locations, the number of Chinese medicine doctors ranged from 50 to 100.

Through 12-week interviews and questionnaire surveys, 400 Chinese medicine doctors from 4 Chinese medicine hospitals participated in the survey, and we received a total of 400 questionnaires. Table 1 shows an overview of valid respondents. All subjects had informed consent to be included in the study before participating in the study. In addition, the personal information of the respondents in this study will be highly respected and strictly confidential.

Results

Identification of Critical Items

The results show that the preliminary survey has obtained 75 potential projects that may affect the competence of TCM doctors. Based on the definitions and critical actions, we collected 21 items relating to abilities from the generic competency dictionary.

We grouped items with similar meanings together to avoid redundancy. We gave most of the definitions concerning the generic competency dictionary. For items that cannot be directly attributed to a single attribute in the dictionary but are often mentioned by other resources, a new term is created to cover its core ideas.

After analyzing the pilot survey results, a list of 21 potentially critical items was prepared for the large-scale questionnaire survey, with corresponding detailed definitions (table 2). We statistically described all the items in Table 3.

Factor Analysis

Explanatory Factor Analysis

Generally speaking, factor analysis starts with explanatory factor analysis. The purpose of descriptive factor analysis is to simplify variables into several main components, thereby revealing the internal structure and interrelationships between factors.

KaiserMayer-Olkin sampling adequacy test (KMO test) and Bartlett sphericity test (Bartlett test) [17] were used to evaluate the suitability of factor analysis for this data set. The KMO test value is 0.66, which meets the general standard; the Bartlett test value is 8078, which indicates that we can reject the null hypothesis ($p < 0.001$). The results show that there is a significant interaction between the factors (Table 4).

The principal component analysis is used to extract the items whose initial feature value and factor load value are more significant than 0.4.

Essentially, factor analysis is replacing many variables with several common factors to reflect the information contained in these variables to the maximum extent [18]. On this basis, the concepts of factor loading and explanatory variance are put forward. The factor load is defined as the correlation coefficient between the variable and the common factor, representing the exposure degree of the common element to the dominant variable. The sum of the square factor loading of all variables for a given factor refers to the variance of all variables explained by the factor. This means that the grouping results of items depend on different factor loads. The interpretability of the proposed factor structure can be measured by the variance ratio explained by the factors.

The coefficient load matrix after rotation is shown in Table 5. According to the meaning of the project and the grouping results, these groupings are identified as three factors, which represent different aspects of the security capabilities derived from the competency theory, as shown below.

Confirmatory Factor Analysis

The reliability and validity of the model were tested by confirmatory factor analysis (CFA). In terms of reliability, Cronbach's alpha test is used to evaluate the reliability of internal consistency, which reflects the correlation between questionnaire items in one dimension [19]. This result determines whether the proposed questionnaire can stably measure the identified factors.

Based on experience, some professionals require 0.70 or higher reliability as the ideal reliability level, and 0.60 is generally considered the lowest acceptable threshold. The alpha value of Cronbach is shown in Table 6. The overall α results show that the compiled measurement scale is reliable, which means that the grouping of extraction factors is appropriate.

In terms of validity, two kinds of truth, convergent validity and discriminant validity, are introduced to ensure the strong correlation between the same factor items and the whole distinction between different factors [19]. Its validity was verified by standardized factor load ($FL > 0.5$), structural reliability ($CR > 0.7$), mean square error extraction ($AVE > 0.5$), and the square root of mean square deviation (more significant than the correlation coefficient between factors). The results are shown in Table 7, and Table 8 confirm the effectiveness of the proposed grouping.

Structural Equation Modeling

The results of EFA and CFA support the rationality of dividing 20 projects into three groups. According to the composition of each group and the corresponding definition of the project, a structural equation model was established, and the relationship between them is shown in Figure 1. Table 9 analyzes the validity test of the recognition factor.

Discussion

Traditional Chinese medicine is a subject that studies human physiology and pathology, as well as the diagnosis and prevention of diseases[20]. It has a long history and unique theory and technical methods of the medical system. It grasps the state of human health as a whole, pays attention to the treatment of non-disease, has definite clinical effect, flexible treatment method, low cost, individual and health care, and is a high-quality resource of health service with original characteristics in our country[21]. At the same time, it is also an indispensable part of the development of medicine and health in our country[22]. Therefore, the competence of traditional Chinese medicine doctors plays a vital role in the development of traditional Chinese medicine[23]. At present, TCM human resources mainly exist in the selection, use, evaluation, distribution, incentive, promotion, access and other policies of TCM talents are not perfect, and there is less investment in the development and construction of TCM human resources[24].

In this study, through the collection of relevant literature, expert consultation, expert questionnaire collection and collation, as well as interviews with traditional Chinese medicine doctors, the competency model of traditional Chinese medicine doctors in traditional Chinese medicine hospitals was constructed. Taking traditional Chinese medicine hospitals as samples, the questionnaire survey of traditional Chinese medicine practitioners is mainly to score the competency factors of traditional Chinese medicine practitioners, and to verify the competency model of traditional Chinese medicine practitioners through the analysis and collation of data. The main methods are internal consistency reliability test, principal component analysis and structural equation modeling.

In our study, we extracted 21 competency items from the competency DICTIONARY [25]. Most of the items have internal influence. These factors are analyzed by investigating TCM doctors' cognition of their characteristics. The proposed model focuses on the internal differences of different TCM doctors rather than external changes.

EFA and CFA mathematically divide the project into three potential factors, and then construct these factors through structural equation and competency theory. The basic medical knowledge of factor 2 is the basis of the model, because the individual role is formed on the basis of their experience, which indicates that this function is not easily affected by the external environment.

SEM models have been validated to analyze potential structural factors that constitute the competence of TCM doctors. The results show that the model meets the requirements of general goodness of fit[26]. Therefore, the main factors affecting personal competence and related performance can be determined by the functions of communication, administrative affairs, diplomacy, decision-making, human resource management, time management, learning and innovation, response, execution and asset management. In this study, personal role has the greatest impact on ability[27]. As far as other factors are concerned, it is not surprising that relatively visible factors also play a crucial role in developing capabilities, as most of the current training programs and on-site rules and regulations are designed to improve capabilities. It is worth noting that the important path between the other two factors also proves the effectiveness of the introduction of competency theory. In other words, the significant influence of cognition and skills reminds researchers that correct cognition and cooperation between TCM doctors is a necessary condition to develop their abilities.

The research results support the existence of influencing factors infrastructure in competency theory [28]. The model provides a reasonable overall description of the interaction between these factors. Therefore, this exploration has produced an interpretable framework to promote the understanding of the reasons behind TCM doctors' different reactions. The results also have practical significance. For human resource personnel, competency model can be used as an evaluation tool for recruitment, selection, training and other work. Whether TCM practitioners can complete the work is influenced and determined by various characteristics[29]. In depth understanding of these characteristics is of great significance to improve the work performance of traditional Chinese medicine doctors. In this paper, based on the competency theory, combined with EFA, CFA and SEM, the competency evaluation model of traditional Chinese medicine doctors is established[30, 31]. It is found that five factors have a significant impact on the performance of TCM doctors, namely, professional value attitude, basic medical knowledge, communication skills, clinical skills and information management.

As far as I know, this study is the first attempt of the theory and method of TCM doctor's ability. The purpose of this study is to provide a comprehensive theoretical framework based on competency theory, in order to contribute to the knowledge system of TCM doctors' characteristics and behaviors. In practice, this study confirmed the rationality of using targeted strategies to optimize work performance, and proposed a preliminary method of on-site evaluation of traditional Chinese medicine practitioners. In addition, the findings emphasize the need for managers and professionals to develop a training system to properly and smoothly integrate TCM doctors into hospital staff.

Declarations

Ethics approval and consent to participate

All subjects had informed consent to be included in the study before participating in the study. All methods were carried out in accordance with relevant guidelines and regulations. All experimental protocols were approved by Hangzhou normal university ethics committee.

Consent for publication

All the authors support the publication.

Availability of data and materials

All the data in this paper can be obtained from the corresponding author.

Competing interests

All the authors declare that there are no competing interests.

Funding

None

Authors' contributions

Jinyi Wu design the research. Xiaohe Wang design the research. Qing Tao write the article and conduct the questionnaire. Lan Mu analyzed the data.

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References

- [1]. Xiang, Y.Z., et al., A comparison of the ancient use of ginseng in traditional Chinese medicine with modern pharmacological experiments and clinical trials. *Phytotherapy Research Ptr*, 2010. 22(7): p. 851-858.
- [2]. Patanakul, P. and D. Milosevic, A competency model for effectiveness in managing multiple projects. *Journal of High Technology Management Research*, 2008. 18(2): p. 118-131.
- [3]. Lao, Y.L.Y., et al., A data mining research method based on the concept of evidence based TCM inheritance in famous veteran TCM doctors' personal medical records. 2011.
- [4]. Iwasaki, K. A randomized, observer-blind, controlled trial of the traditional Chinese medicine Yi-Gan San for improvement of behavioral and psychological symptoms and activities of daily living in dementia patients. 2005.

- [5]. Wen-Xia, B.I., et al., Analysis of Medication Frequency in the Treatment of Coronary Heart Disease by Distinguished Veteran TCM Doctors. *World Journal of Integrated Traditional & Western Medicine*, 2014.
- [6]. Tian, R. and N. Liu, Bibliometric Analysis of Prominent TCM Doctors Experience Researches. *Chinese Journal of Information on Traditional Chinese Medicine*, 2011.
- [7]. Wang, Y., et al., Comparison of General Rules and Individual Differences in Clinical Experience from the Veteran TCM Doctors. *World Science & Technology*, 2009.
- [8]. Paterson, R.R.M., Cordyceps: a traditional Chinese medicine and another fungal therapeutic biofactory? *Cheminform*, 2008. 69(7): p. 1469-1495.
- [9]. Hage, W.R.V., et al., Design and use of the Simple Event Model (SEM). *Social Science Electronic Publishing*, 2011. 9(2): p. 128-136.
- [10]. Calhoun, J.G., et al., Development of an interprofessional competency model for healthcare leadership. *Journal of Healthcare Management*, 2008. 53(6): p. 375-389.
- [11]. Villarrubia, J.S., et al. Dimensional metrology of resist lines using a SEM model-based library approach. 2004.
- [12]. Poon, P.M.K., et al., Immunomodulatory effects of a traditional Chinese medicine with potential antiviral activity: a self-control study. *American Journal of Chinese Medicine*, 2006. 34(01): p. 13-21.
- [13]. Burchfield, N. and P. Mugge, Innovation management business competency model. 2006: US.
- [14]. Feng, G., et al. Inferring individuals' sub-health and their TCM syndrome based on the diagnosis of TCM doctors. 2010.
- [15]. Nicola, et al., Integrative Medicine—Traditional Chinese Medicine, A Model? *Chinese Journal of Integrative Medicine*, 2011. 01(v.17): p. 23-27.
- [16]. Hauck, K. and X. Zhao, A structural equation model of adverse events and length of stay in hospitals. *Monash Econometrics & Business Statistics Working Papers*, 2010.
- [17]. Kanaan, S.F., et al., Structural equation model analysis of the length-of-hospital stay after lumbar spine surgery. 2015. 15(4): p. 612-621.
- [18]. Marsh, H.W., et al., Exploratory Structural Equation Modeling, Integrating CFA and EFA: Application to Students' Evaluations of University Teaching. *Structural Equation Modeling A Multidisciplinary Journal*, 2009. 16(3): p. 439-476.
- [19]. Nandi, S. and S. Singh, Impact of marketing stimuli on mobile phone buying behaviour of young Indian adults—an EFA and CFA approach. 2015.

- [20]. Meng, et al., Prospective randomised evaluation of traditional Chinese medicine combined with chemotherapy: a randomised phase II study of wild toad extract plus gemcitabine in patients with advanced pancreatic adenocarcinomas. *British Journal of Cancer*, 2012.
- [21]. Sun, H., et al., Proteomics study on the hepatoprotective effects of traditional Chinese medicine formulae Yin-Chen-Hao-Tang by a combination of two-dimensional polyacrylamide gel electrophoresis and matrix-assisted laser desorption/ionization-time of flight mass spectrometry. *Journal of Pharmaceutical & Biomedical Analysis*, 2013. 75: p. 173-179.
- [22]. Ning, X.I., et al., Questionnaire on papers about senior TCM doctors' experience in *Journal of Beijing University of Traditional Chinese Medicine (Clinical Medicine)*. *Journal of Beijing University of Traditional Chinese Medicine*, 2011. 34(05): p. 342-344.
- [23]. Bensoussan, A., S.P. Myers and A.L. Carlton, Risks associated with the practice of traditional Chinese medicine: an Australian study. *Archives of Family Medicine*, 2000. 9(10): p. 1071.
- [24]. Yi, W., et al. Sensitivity-based data selection for predicting individual's sub-health on TCM doctors' diagnosis. 2011.
- [25]. Wang, Y., et al., SENSITIVITY-BASED INFORMATION SELECTION FOR PREDICTING INDIVIDUAL'S SUB-HEALTH ON TCM DOCTORS' DIAGNOSIS DATA. *J Soft*, 2012. 23: p. 749-760.
- [26]. Chen, Y.C., TCM Database@Taiwan: The World's Largest Traditional Chinese Medicine Database for Drug Screening In Silico. *Plos One*, 2012. 6(1): p. e15939.
- [27]. Springer, L., TCM-Doctors from the PRC in Vienna: Hybrid Professionalism and Chinese Tradition. 2007.
- [28]. Isabel, S.V.A.D., R. Rahim and W. Man-Sau, The Use of Omic Technologies Applied to Traditional Chinese Medicine Research. *Evidence-Based Complementary and Alternative Medicine*, 2017, (2017-01-31), 2017. 2017: p. 6359730.
- [29]. Gabriela, et al., Theory of planned behavior and smoking: meta-analysis and SEM model. *Substance Abuse & Rehabilitation*, 2010.
- [30]. Ling, C.Q., X.Q. Yue and C. Ling, Three advantages of using traditional Chinese medicine to prevent and treat tumor. *Journal of Integrative Medicine*, 2014. 12(4): p. 331-335.
- [31]. Lai, D. and N. Chappell, Use of Traditional Chinese Medicine by older Chinese immigrants in Canada. *Family Practice*, 2007. 24(1): p. 56-64.

Tables

Table 1. The profile of respondents.

Category	Range	Frequency
Age	<26	5
	26-35	313
	36-45	61
	>55	21
Gender	Male	131
	Female	269
Education	Colleges	3
	Bachelor	45
	Master degree	352
Experience	5 years<	29
	5-10 years	82
	>10 years	289

Table 2. Definitions of items included in the questionnaire.

No.	Items	Definition
1	Ethics and morality.	moral code that guides a person's choices and behaviors throughout their life
2	Professional values.	A generic term for the principles that are central to practising a profession which, for medicine, includes integrity, compassion, altruism, continuous improvement, excellence and ability to partner with members of the wider healthcare team.
3	Respect patient.	Show the respect in the clinical process
4	Ability of self-regulation.	Regulation of life and work.
5	Respect other health professionals.	Show respect to other medical professionals.
6	Basic theory of traditional medicine.	Grasp the Chinese traditional medicine basic theory.
7	Basic knowledge of traditional medicine.	Grasp the Chinese traditional medicine basic knowledge.
8	Classical books of traditional medicine.	Own a number of traditional medicine books.
9	Other medical knowledge.	Having other medical knowledge.
10	Communicate effectively with others.	Ability to communicate with others.
11	Solve problems in teamwork.	Having the spirit of team work.
12	Ability of oral or written communication.	Having the ability to communicate with others in oral and written ways.
13	Good job in health education.	Having the awareness to express health education.
14	Diagnose and treat diseases with dialectical theory.	Having the ability to diagnose and treat diseases with dialectical theory.
15	Diagnose disease comprehensively with laboratory.	Considering laboratory results when diagnosing disease.

16	Chinese medicine skills like acupuncture and massage.	Ability to do some Chinese medicine physical therapy.
17	Rescue principles of western medicine.	Ability to do cardio-pulmonary resuscitation.
18	Standardized treatment.	Knowing how to do standardized treatment.
19	Collect medical information through database.	Ability to use internet to collect medical information.
20	Diagnosis and treatment with network.	Ability to diagnose disease through internet.
21	Keep records of patients.	Awareness to keep patients' records.

Table 3. The statistical description of items

No.	Items	Mean	S.D.
1	Ethics and morality.	2.57	0.61
2	Professional values.	2.75	0.47
3	Respect the patient.	2.87	0.34
4	Ability of self-regulation.	2.55	0.51
5	Respect other health professionals.	2.73	0.47
6	Basic theory of traditional medicine.	2.83	0.4
7	Basic knowledge of traditional medicine.	2.91	0.29
8	Classical books of traditional medicine.	2.84	0.4
9	Other medical knowledge.	2.86	0.35
10	Communicate effectively with others.	2.85	0.36
11	Solve problems in teamwork.	2.79	0.44
12	Ability of oral or written communication.	2.84	0.41
13	Good job in health education.	2.64	0.52
14	Diagnose and treat diseases with dialectical theory.	2.74	0.51
15	Diagnose disease comprehensively with laboratory.	2.73	0.45
16	Chinese medicine skills like acupuncture and massage.	2.87	0.34
17	Rescue principles of western medicine.	2.68	0.54
18	Standardized treatment.	2.74	0.55
19	Collect medical information through database.	2.94	0.25
20	Diagnosis and treatment with network.	2.64	0.58
21	Keep records of patients.	2.55	0.62

Table 4. Kaiser-Mayer-Olkin (KMO) sampling adequacy and Bartlett's test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.66
Bartlett's Test of Sphericity	Approx. Chi-Square	8078
	df	210
	Sig.	0.000

Table 5. Factor loading matrix after varimax rotation.

Item	Items	Component				
		1	2	3	4	5
1	Ethics and morality.	0.56	0.57	0.3	-0.18	-0.17
2	Professional values.	0.61	-0.23	-0.12	0.28	0.33
3	Respect the patient.	0.56	-0.51	0.12	-0.31	-0.24
4	Ability of self-regulation.	0.39	0.14	0.1	-0.42	0.05
5	Respect other health professionals.	0.54	0.17	-0.46	-0.08	0.28
6	Basic theory of traditional medicine.	0.33	0.36	0.18	0.06	0.22
7	Basic knowledge of traditional medicine.	0.4	0	0.27	0.66	-0.04
8	Classical books of traditional medicine.	0.69	-0.59	0.3	-0.11	-0.11
9	Other medical knowledge.	0.59	0.08	-0.63	0.14	-0.39
10	Communicate effectively with others.	0.37	-0.1	-0.14	-0.35	0.17
11	Solve problems in teamwork.	0.64	-0.23	-0.14	0.21	0.36
12	Ability of oral or written communication.	0.71	-0.59	0.33	-0.07	-0.08
13	Good job in health education.	0.52	-0.03	0.1	-0.3	0.06
14	Diagnose and treat diseases with dialectical theory.	0.56	-0.16	-0.13	0.01	0.15
15	Diagnose disease comprehensively with laboratory.	0.65	0.07	-0.04	0.22	-0.2
16	Chinese medicine skills like acupuncture and massage.	0.61	0.11	-0.64	0.08	-0.36
17	Rescue principles of western medicine.	0.48	0.23	-0.39	-0.1	0.29
18	Standardized treatment.	0.37	0.56	0.25	0.17	0.09
19	Collect medical information through database.	0.43	0.02	0.33	0.68	-0.03
20	Diagnosis and treatment with network.	0.56	0.2	0.29	-0.34	0.1

Table 6. Cronbach's α reliability test of identified factors.

No.	Factors	Cronbach's α
Factor 1	Professional value attitude.	0.58
Factor 2	Basic medical knowledge.	0.44
Factor 3	Communication skills.	0.65
Factor 4	Clinical skills.	0.64
Factor 5	Information management	0.58

Table 7. Cronbach's α reliability test of identified factors.

Factor	Items	FL	CR	AVE
Professional value attitude.	Ethics and morality.	0.95	0.58	0.34
	Professional values.	0.14		
	Respect the patient.	0.17		
	Ability of self-regulation.	0.44		
	Respect other health professionals.	0.24		
Basic medical knowledge.	Basic theory of traditional medicine.	0.12	0.44	0.29
	Basic knowledge of traditional medicine.	0.31		
	Classical books of traditional medicine.	0.93		
	Other medical knowledge.	0.2		
Communication skills.	Communicate effectively with others.	0.28	0.65	0.36
	Solve problems in teamwork.	0.5		
	Ability of oral or written communication.	1		
	Good job in health education.	0.41		
Clinical skills.	Diagnose and treat diseases with dialectical theory.	0.5	0.64	0.28
	Diagnose disease comprehensively with laboratory.	0.71		
	Chinese medicine skills like acupuncture and massage.	0.67		
	Rescue principles of western medicine.	0.5		
	Standardized treatment.	0.37		
Information management	Collect medical information through database.	0.24	0.58	0.62
	Diagnosis and treatment with network.	0.58		
	Keep records of patients.	0.98		

Table 8. Discriminant validity test of the identified factors.

Factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1				
Factor 2	1.29	1			
Factor 3	1.2	1.13	1		
Factor 4	1.12	1.28	0.8	1	
Factor 5	1.16	1.18	0.8	0.97	1

Table 9. Discriminant validity test of the identified factors.

Parameter	Coefficient
χ^2	1929.530
χ^2/df	19.59
RMSEA	0.214
TLI	0.412
CFI	0.574

Figures

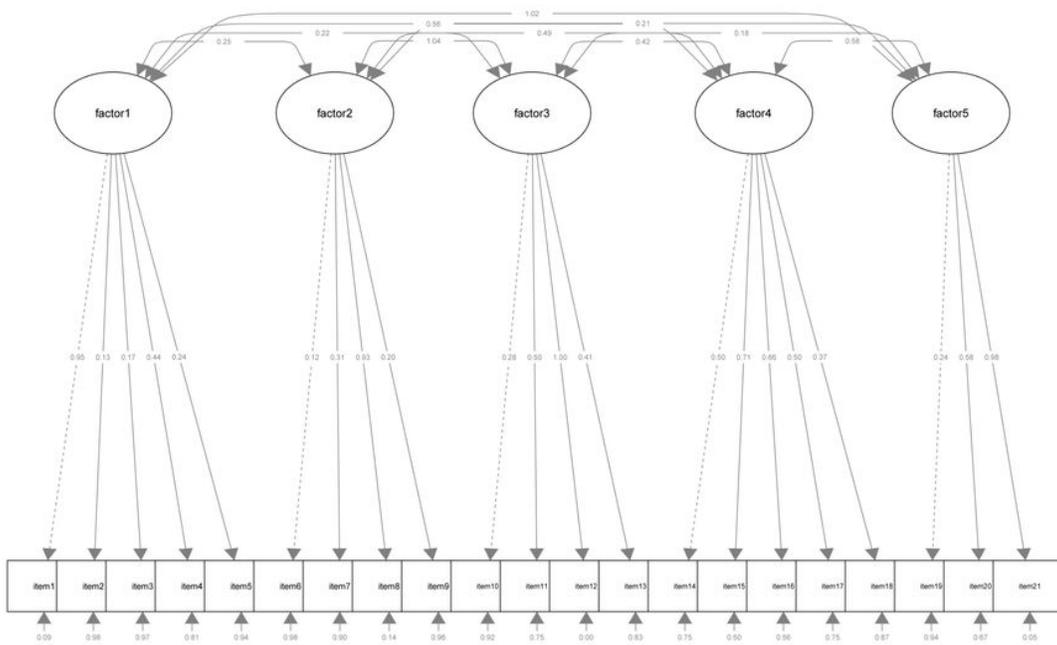


Figure 1

Structural equation model of TCM doctor competency.