

Development of a competency model for general practitioners in China by a modified Delphi method

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Research Article

Keywords: China, competency, Delphi method, general practitioner, training

Posted Date: March 30th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-319609/v1>

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Abstract

Background.

General practitioner training in China has gradually been structured into a “5 + 3” residency training model. However, no competency model for general practitioners is implemented to evaluate the level of clinical competence attained by general practice trainees. This study was conducted to develop a consensus set of competencies for general practitioners in China.

Methods.

A modified Delphi process was deployed to develop the competency model for general practitioners in China, including two stages: (1) generation of an initial set of relevant competencies derived from a literature review, behavioral observation of GP–patient consultations, and critical incidents interview of GPs; (2) a 2-round, web-based Delphi survey of experts in general practice, selected using purposive sampling, to prioritize and gain consensus on the essential competencies of GPs.

Results.

From the literature review, behavioral observation, and critical incidents interview, 46 competencies in 7 domains were identified. After two rounds of Delphi survey of 28 participants (18 [64.3%] women; mean [SD] age, 47.9 [9.3] years) representing a range of health professionals (GPs, managers, and researchers), a consensus was reached on 50 competencies categorized into 7 domains.

Conclusion.

A consensus-based competency model for general practitioners in China has been identified that may be used to evaluate the general practitioners’ clinical competence after standardized training.

Background

Primary health care (PHC) plays a very crucial role in high-performing health care system. In recent years, hospital-centric health delivery system was popular in China, in which patients preferred to get medical services in large public tertiary hospitals rather than PHC institutions, leading to a perception of health services as “too difficult to access and too expensive” [1]. Therefore, several policies has been introduced to improve PHC system in China to provide citizens with affordable and equitable access to basic health care [2–4]. In 2019, Chinese government invested ¥215 billion to PHC institutions [5], increasing by nearly eightfold from ¥27 billion in 2009 [6]. With the strong support of the government, the primary care network was mostly developed around China. According to statistics in 2019, there were 954,390 PHC institutions across China, with 4.53 billion PHC visits in that year (accounting for 52.0% of the total visits) [7], increasing by 58.9 % compared to the PHC visits in 2009 [8].

High-quality professionals are an integral part of the development of PHC. General practitioners (GPs), the core of PHC, are often referred to as “gatekeepers.” A novel model called the GP team was promoted in China in 2011, in which, GPs, nurses, and, sometimes, public health doctors work as a team to provide continuous and comprehensive medical services to enrolled residents [9]. At the same time, the State Council advised that GP system should be established and GP training scheme should be structured into “5 + 3” mode (GPs should receive 5-year undergraduate-level clinical medical education, followed by 3-year post-graduate GP standardized training) [10]. According to statistics in 2019, there were 365,000 GPs in China, with 2.61 GPs for per ten thousand residents [6], which has achieved the goal of at least 2–3 GPs per ten thousand residents in 2020 [10, 11].

Recently, promoting professionalism has become an explicit objective in GP training. Evaluation of professional competence is a vital element of this initiative. Professional competence in medicine was defined as “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served” by Epstein and Hundert in JAMA [12]. There were practical competency models in developed countries, such as the European Definition of General Practice/Family Medicine in Europe [13], CanMEDS-FM 2017 in Canada [14], The Family Medicine Milestone Project in US [15], Workplace Based Assessment and Annual Review of Competence Progression guidance in UK [16], and Competency profile of the Australian general practitioner at the point of fellowship in Australia [17]. These competency models were used to evaluate the GPs’ professional performance in the workplace.

As the functions of PHC institutions in China include providing generalist care and implementing the National Basic Public Health Services Program [18], the role of the GP in China was different from the counterparts in other countries. Many researchers in China had tried to explore the competencies required for the role of GP in China. A literature review of 31 studies evaluating competencies of GPs in China, conducted by our research team before this research, found that more than half of the included studies did not develop a psychometrically robust, high-quality instrument and no competency model was intended to be used in standardized training [19]. As the competency-based training model was embraced in China, the evaluation of competency was an important part of training program. In response to this need, this research was conducted to develop a competency model required for the occupation of GP.

Methods

Design

This was a study developing of competency model for general practitioners through a modified Delphi method. The Delphi method is a structured process for consensus-building among a diverse group of experts. The approach has commonly been adopted in medical research [20] and remains today the most widely used method for selecting quality indicators in healthcare [21]. The process ends when an agreement has been reached on the discussed topics. According to the previous studies, two or three rounds are frequently used in the Delphi process [22-23]. This study involved two rounds of questionnaires to an expert panel via e-mail from September to November 2020. All methods in the Delphi process were carried out in accordance with previous studies [22-24] and research guideline for the Delphi survey technique [25].

This modified Delphi process was deployed based on two stages: (1) generating an initial set of relevant competencies derived from a literature review, behavioral observation of GP–patient consultations, and critical incidents interviews of GPs; (2) conducting a 2-round, web-based Delphi survey of experts in general practice to prioritize and gain consensus on the essential competencies of GPs. Please see Figure 1 for the process of the Delphi study.

Participants

A list of eligible experts was initially selected considering the representation of all potential differences in background, occupational environment and clinical practices. The experts were invited based on the following inclusion criteria: (1) working as GP, educator, or administrative leader in general practice department; (2) having at least 5 years' working experience in general practice; (3) being familiar with requirement of GP; (4) being familiar with "5+3" residency training; (5) being from various geographic regions within China. The participants were asked for their willingness to take part in the study. In a preliminary recruitment round, 30 eligible experts were invited to participate in the study and 28 experts agreed to participate.

Questionnaire preparation

The potential competencies were generated based on a literature review, behavioral observations, and critical incidents interviews.

Literature review

A preliminary list of competencies was constructed from three sources by literature review. Firstly, literature was searched in PubMed, EMBASE, Google-Scholar and three Chinese databases (China National Knowledge Infrastructure, Wanfang Data, VIP Chinese Periodical Services) with terms commonly used to describe GP (e.g., general practitioner, family physician, family doctor, community health worker), competency (e.g., competency, competencies, core competencies) and evaluation (e.g., evaluation, measurement, tool, indicator). A total of 37 published research papers describing domestic and foreign GPs' competencies were identified from literature review. Secondly, 5 published competency model from international general practice organizations were also identified, including: the World Organization of Family Doctors (WONCA) [13], the College of Family Physicians of Canada (CFPC) [14], the Accreditation Council for Graduate Medical Education (ACGME) [15], the Royal College of General Practitioners (RCGP) [16], the Royal Australian College of General Practitioners (RACGP) [17]. Thirdly, 2 published policy documents of residency training content and requirement of GP in China were reviewed [26,27].

Potential competencies were extracted from these sources and screened by a panel of 2 reviewers (YW and FYW, Ph.D. candidates) according to the following criteria: (1) the indicator was relevant to requirements of GPs in China; (2) the indicator was measurable. When there were doubts about whether an indicator should be retained, the research team would discuss together to make a decision. There were 88 competencies identified by the screening process.

Behavioral observation

Eleven GPs from 5 community health service institutions (CHSIs) in Beijing were invited to participate based on a convenience sample. Participating GPs were observed when providing medical care in the general practice consultations with each GP for one workday during

November 2019 to January 2020. All consecutive patients visiting the recruited GPs on the observing workday were recruited in our study with oral agreement. During the observation, the information was recorded which including patients' reasons for encounter (RFEs) and medical services provided by GPs. Three research assistants (YW, FYW, and ZLP, Ph.D. candidates) were hired as observers who were postgraduate students, majored in general practice and had a training session before the observation. During the observation, the observers were seated in the least intrusive corner of consulting room and will not talk to the GPs and patients. There were 21 competencies related to GPs' work content were identified by the behavioral observation process.

Critical incidents interview

The same 11 GPs as in behavioral observation were invited and 8 GPs participate in the critical incidents interview. Of those three declined, the reasons was that individuals invited to participate were unable to attend for practical and/or domestic reasons. During the interview, participants were asked to describe incidents with good effect and incidents with bad effect. Questions were asked based a "STAR Principle", which included 'What kind of situation was it at that time?' (Situation), 'What was the main task you faced at that time?' (Task), 'In that incident, what skills did the you display?' (Action), 'What was the final result of this incident?' (Result). The information from incident interview was taped, transcribed, and coded. Three researchers (YW, FYW, and ZLP, Ph.D. candidates) extracted the information about GPs' competencies from the incident interview data respectively. When there were doubts about whether a description of competency should be retained, the research team would discuss together to make a decision. There were 35 competencies were identified by the critical incidents interview process.

A total of 144 competencies were identified by these three processes above. After deleting the duplicate competencies and integrating the competencies with similar dimensions being measured, a preliminary list of 63 potential competencies were left. Then, the competencies were discussed in detail one by one in a research team meeting, concentrating on whether these competencies were measurable and wording them by referring to other competency models. After further removal and integration, 46 potential competencies were left, which were categorized into 7 domains.

Delphi questionnaire

All 46 potential competencies were formatted into the Delphi questionnaire. Importance and feasibility of the competencies were rated on a 1-9 Likert scale (1 = not important/feasible; 9 = very important/feasible). Spaces were left for experts to make comments on these existing competencies or recommend new competencies which they considered should be included in.

Delphi survey

First round. The first round of Delphi survey was performed from September to October 2020, lasting 4 weeks. Materials were sent to experts by e-mail, including first-round questionnaire, research background, and basic demographic information collection form. In the first-round questionnaire, experts were asked to rate the importance and feasibility of each competency, and give their comments.

After the first round of Delphi survey, data was collected and analyzed. The median scores, the distribution of scores (frequency count of answer choices), and comments were reported. For the experts' comments, including modification, deletion and addition, we sort out and make a summary of comments expressed by at least two participants.

Second round. The second round of Delphi survey was performed from October to November 2020, lasting 4 weeks. The second-round questionnaire was sent to experts who had completed the first-round questionnaire by e-mail. In the second-round questionnaire, the competencies which were achieved consensus level or modified based on comments in the first round were retained for Delphi round 2. New competencies were added based on the suggestion by more than two experts. Competencies were removed which did not achieved consensus level or was recommended to be removed by more than 2 experts. Along with the second-round questionnaire, the graph-based report of the results of the first round was also send to experts. Importance and feasibility of each competency were rated using the same 1-9 Likert scale as in the first round.

Consensus. There is no definite consensus criteria for the Delphi study [28]. In this study a consensus was reached based on two selection criteria: median score greater than seven on a nine-point scale and at least 75% of panel ratings in the top tertile (7–9) for importance and feasibility.

Statistical analysis

Descriptive analysis was used to describe the characteristics of participates and results. Means [with standard deviation (SD)] were used to report continuous variables, while frequencies (%) were used to report categorical variables. The Data management and analysis were performed using Statistical Package for Social Science (SPSS), version 22.0.

Results

Panel characteristics in Delphi survey

Of the 28 experts who agreed to participate in the study, all participated in both two rounds of Delphi survey. Among them, 21 experts were from Beijing, 2 experts were from Shanghai, and other 5 experts were from 5 provinces of China (Hainan, Zhejiang, Anhui, Hebei, Inner Mongolia). There were more female participants (64.3%) in this panel, and the mean age of the experts was 47.9 years (standard deviation: 9.3 years). Nearly one third participants were working as GPs in CHSI, 39.3% working as GPs in hospital, 10.7% were researchers in primary care, and 17.9% were leaders of CHSI. The average length of general practice experience was 14.4 years, with 67.9% experts working for more than 10 years in this field. There were 78.6% experts had master or PhD degree and 64.3% experts were with senior grade title (Table 1).

First round

In the first round, 44 (95.7%) of the original 46 competencies achieved good consensus in round one. The median score of competencies' importance and feasibility ranged from 8.00 to 9.00 and 7.00 to 9.00, respectively. The percentage of panel ratings in the top tertile (7–9) for importance and feasibility ranged from 85.7% to 100% and 69.9% to 100%, respectively. There were 2 competencies did not achieve 75.0% agreement in terms of feasibility, which were “3.2 Screen of at risk individuals for population health issues” (69.9% agreement) and “5.5 Allocate external resources of the institution for optimal patient care” (71.4% agreement). The indicator “3.4 Provide chemoprevention care” was recommended to be removed by more than 2 experts, despite the agreement being achieved. So, three competencies were deleted in the first round.

Two descriptions of domains were modified. “2. Basic Medical Services” was modified into “2. Patient care”. “3. Preventive care and basic public health service” was modified into “3. Basic public health service”. Eight competencies (1.10, 2.3, 2.7, 2.8, 3.7, 4.1, 4.5, and 5.4) were modified based on the experts' comments. For example, “1.10 Record electronic health information” was modified into “1.10 Use electronic health record system effectively”. New competencies were suggested by 13 of the 28 experts in the first round. Only 7 new competencies were suggested by more than two experts and hence included in the second round (Table 2). Thus, 50 competencies were included in the second round.

Second round

At this step, 50 competencies were evaluated, including retained, modified, and new competencies. In the second round, the median score of competencies' importance and feasibility ranged from 7.50 to 9.00 and 7.00 to 9.00, respectively. The percentage of panel ratings in the top tertile (7–9) for importance and feasibility ranged from 85.7% to 100% and 82.1% to 100%, respectively. As a result, more than 75% of the experts gave ratings in the top tertile (7–9) to 50 competencies, all of which had a median of 7 or above and a high degree of consensus was achieved in terms of importance and feasibility. Descriptive statistics including the median and percentage agreement for each indicator is shown in Table 2.

At the end of the Delphi process, 50 competencies were finally selected based on the consensus in second round and divided under 7 domains: knowledge and skills (10 competencies), patient care (9 competencies), basic public health services (6 competencies), communication (7 competencies), teamwork (6 competencies), professionalism (6 competencies) and education, learning and research (6 competencies) (Table 3).

Discussion

Main finding

This study was a rigorous process, which involved integrating evidence from a multi-method approach to analyze the behaviors associated with the performance of GP, including a literature review, behavioral observation of GP–patient consultation, and critical incidents interview of GP. Then a modified Delphi survey was conducted in 28 general practice experts, to achieve consensus on the most essential competencies of GPs, which should be feasible to measure in China. The final consensus set includes 50 competencies categorized into 7 domains.

As described previously, competency of GP involved many aspects, such as patient care, communication, professional knowledge and skills, professionalism and practice-based learning [13-17], which were also important for GPs' role in China. For example, the recognition that communication and empathy were derived from all job incumbents, which implies that these are important aspects of the job role [24]. The results in previous studies suggested that effective communication was crucial to doctor-patient relationship [29], and for general practice in particular, in which communication and empathy was essential in patient-centered care [30]. In competency model of GPs in China, communication with patients was emphasized as most competencies in this domain (5/7) being involved in doctor-patient communication.

It is notable that there are three aspects special in China: basic public health service, teamwork, and research. To tackle health inequity, providing universal basic public health services for residents is the main goal of the new health reform in China. Since 2009, basic public health services programs have been widely carried out across PHC sectors in China [31], which now includes 14 categories, such as health records management for residents, health education, vaccination, reporting of infectious diseases and public health emergencies, and etc. [18]. GPs in PHC system play key roles in delivering majority of basic public health services. Therefore, we made an attempt to identify competencies in this domain on the basis of basic public health services programs and the experts' consensus. Six competencies were emphasized as an independent domain "3. Basic public health service". Since 2011, many provinces and cities in China have explored mode of "family doctor contract" services, which help to let patients have their personal doctors and improve the continuity of care based on GP team with a GP, a nurse, and a preventive care physician [32]. In that case, the ability of working effectively with others in a collaborative team-based model is emphasized to GPs in China. Besides, the collaborative leadership is also an important indicator as GP plays the role of leader in the team. In China, research ability and paper are critical to physicians in career advancement. During the standardized training program, GPs can be trained with the ability of scientific research [26], which should be evaluated. Therefore, three competencies were included in our competency model according to experts' opinion.

The development of appropriate assessment tools to evaluate the GPs' competencies is challenging in China. A literature review of 31 studies evaluating competencies of GPs in China, conducted by our research team before this research, found that more than half of the included studies did not use a psychometrically robust, high-quality instrument to measure their outcomes [19]. In this study, we organized the Delphi questionnaire that encompassed previous studies regarding GP competencies and published competency model from international general practice organizations [13-17]. Then, further competencies related to the work content of GPs were added by behavioral observation of GP-patient consultations and critical incidents interview of GPs. The results could be expected as some competencies are only identifiable by the job holders or are directly observed by the third party during the GP-patient consultation process. By means of these methods, which were adopted in previous study in England [24], more comprehensive competencies have been developed. This competency model marks a major improvement on previous research.

In this Delphi process, the importance and the feasibility of the competencies were both rated and finally achieved the consensus. This set of competencies just provide a basis for the competency measurement of GPs in China, which still needs to be tested in practice in a further study [33]. We suggest compiling these competencies in our model into a questionnaire for self-evaluation by GPs or multi-source assessment by other staff of GPs [34].

Strengths and limitations

The quality of the panel experts and their opinions on the given topic is seen as strength of the Delphi technique [35]. In this study, the presence of different fields (GPs in hospitals, GPs in CHSIs, leaders of CHSIs, and researchers in universities) and different geographical contexts (28 experts from 7 provinces of China), along with the average length of general practice experience (14.4 years), suggested that our expert panel represented a broad and experienced group. Furthermore, the response rate of our study was satisfactory, namely 100% in two rounds of Delphi process. This was a pleasing result as response rate was a recognized problem in Delphi study. Importantly, this meant that experts had much interest and active participation in this topic.

There are limitations of this study. First, although experts in this study were from different geographical contexts, most were from Beijing and the proportion of experts in other provinces was unsatisfactory. They may not adequately represent the full spectrum of views held by individuals in various regions across China. Second, patients' opinion was not involved in the sources of competency. Patients are the customers and beneficiaries of general practice services, who may give a deeper insight in health care experience and doctor-patient communication [24]. This should be taken into consideration in further study. Last, this methodology of Delphi process is relies on the perception of experts, which may influence the implementation for lacking actual evidence from real implementation [36]. Further study is needed to apply this competency model and confirm the validity of these competencies.

Conclusion

Based on a systematic consensus process, the competency model of GPs in China has been developed and described. Self-evaluation and multi-source feedback were recommended to use this model in exploring GPs' clinical performance and professional behaviour. Before putting it into practice, this competency model still need to be validated in a further study.

Declarations

Authors' contributions

YW and XQL designed the study. XQL obtained funding and ethical approval. YW, FYW, ZLP, MRW, and YLL were responsible for the indicator generation and Delphi survey process and statistical analyses. YW drafted the manuscript. GHJ and XQL contributed to the interpretation of the results and critical revision of the manuscript for important intellectual content and approved the final version of the manuscript. All authors have read and approved the final manuscript.

Ethics approval and consent to participate

This study was approved by the Ethical Committee of Capital Medical University, Beijing, China. Written informed consents were achieved from all the participants in this study. The participants were assured that their information would only be used for analysis in this study.

Funding

This work was supported by the Capital General Practice Research Project (17QK06). The funding organization had no role in the design, conduct, analysis and interpretation or preparation of this study.

Acknowledgements

The authors thank the Capital General Practice Research Project (17QK06) for the support. The authors also thank all of the participants for their support and help to our research.

Availability of data and materials

The data used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Abbreviations

PHC, primary health care; GPs, General Practitioners; WONCA, the World Organization of Family Doctors; CFPC, the College of Family Physicians of Canada; ACGME, the Accreditation Council for Graduate Medical Education; RCGP, the Royal College of General Practitioners; RACGP, the Royal Australian College of General Practitioners; CHSI, community health service institution; RFEs, reasons for encounter.

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Tables

Table 1. Panel characteristics of the Delphi process (n=28)

Characteristics	Frequency	Percentage (%)
Gender		
Male	10	35.7
Female	18	64.3
Age, years		
30-39	4	14.3
40-49	15	53.6
≥ 50	9	32.1
Professional field		
GPs in CHSI	9	32.1
GPs in hospital	11	39.3
Professors in medical university	3	10.7
Leader of CHSI	5	17.9
Working years		
< 10	9	32.1
≥ 10	19	67.9
Highest degree		
Bachelor	6	21.4
Master	17	60.7
PhD	5	17.9
Professional title*		
Middle grade title	4	14.3
Associate senior grade title	6	21.4
Senior grade title	18	64.3

Abbreviation: GP General practitioner; CHSI Community health service institution

*Note: medical professional titles include junior grade, middle grade, associate senior grade and senior grade titles, which are based upon work experience and research achievement of health professional

Table 2. Results of the Delphi process

Competencies	Round 1				Round 2				Status
	Importance		Feasibility		Importance		Feasibility		
	Median	Agreement (7-9)	Median	Agreement(7-9)	Median	Agreement(7-9)	Median	Agreement(7-9)	
ledge and skills									
1.1 Be with in-depth knowledge of clinical medicine	9	100%	9	100%	9	100%	9	96.4%	Included
1.2 Be with in-depth knowledge of general practice	9	100%	9	96.4%	9	100%	9	100%	Included
1.3 Be with in-depth knowledge of public health	9	100%	9	96.4%	9	96.4%	9	92.9%	Included
● 1.4 Be with in-depth knowledge of rehabilitation	-	-	-	-	8	92.9%	8	85.7%	Included
● 1.5 Be with in-depth knowledge of psychology and sociology	-	-	-	-	8.5	96.4%	8	89.3%	Included
1.6 Be equipped with the skill of history taking	9	100%	9	92.9%	9	96.4%	9	96.4%	Included
1.7 Be equipped with the skill of physical examination	9	100%	9	96.4%	9	100%	9	100%	Included
1.8 Interpret basic clinical tests and images correctly	9	100%	9	96.4%	9	100%	9	100%	Included
1.9 Be equipped with the skill of clinical operation	9	100%	9	96.4%	9	100%	9	100%	Included
1.10 Record electronic health information (*Use electronic health record system effectively)	9	100%	9	92.9%	9	100%	9	100%	Included
Medical Services (*Patient									
2.1 Manage diseases at early stage presenting in an undifferentiated way	9	100%	9	96.4%	9	100%	9	96.4%	Included
2.2 Manage simultaneously multiple complaints and pathologies, both acute and chronic health problems in the individual	9	100%	9	100%	9	100%	9	100%	Included
2.3 Treat patients at acute, severe and dangerous stages (*Manage emergency conditions)	9	100%	9	100%	9	100%	9	100%	Included
2.4 Arrange referrals to specialists when necessary	9	100%	9	92.9%	9	96.4%	9	92.9%	Included
● 2.5 Ensure patient safety	-	-	-	-	9	100%	9	92.9%	Included
● 2.6 Provide advice of rehabilitation when necessary	-	-	-	-	8	100%	8	92.9%	Included
2.7 Sign contracts with patients (*Sign contracts with patients and provide continuous service)	9	96.4%	8.5	85.7%	9	96.4%	9	92.9%	Included
2.8 Follow-up in patients' home (*Provide home visit and follow-up)	9	96.4%	8	78.6%	8.5	96.4%	8	85.7%	Included
2.9 Provide home care when necessary	9	96.4%	9	92.9%	8	89.3%	8	89.3%	Included
ntive care and basic public 1 service (*Basic public 1 service)									

3.1 Organize health education	9	100%	9	89.3%	9	100%	9	96.4%	Included
▲ 3.2 Screen of at risk individuals for population health issues	8.5	92.9%	8	69.9%	-	-	-	-	Deleted
3.3 Provide preventive care by vaccination	9	92.9%	9	92.9%	9	92.9%	9	92.9%	Included
▲▲ 3.4 Provide chemoprevention care	8	85.7%	8	78.6%	-	-	-	-	Deleted
3.5 Establish and manage the health files	9	100%	9	92.9%	9	100%	9	100%	Included
3.6 Manage the care of special population in the community (elderly, women, children, disabled, patients with mental illness)	9	100%	8	89.3%	9	92.9%	9	96.4%	Included
3.7 Manage chronic condition (*Undertake the continuing management of chronic health problems)	9	100%	9	96.4%	9	100%	9	100%	Included
3.8 Identify and manage public health emergencies	9	100%	9	96.4%	9	100%	9	100%	Included
Communication									
4.1 Listen respectfully to patient and family (*Listen carefully to patients and be empathy)	9	100%	9	92.9%	9	100%	9	92.9%	Included
4.2 Explain things clearly and check for patients and families understanding	9	100%	9	92.9%	9	100%	8.5	92.9%	Included
4.3 Discuss with patients and families about their health condition and thoughts	9	100%	8.5	92.9%	9	96.4%	8	85.7%	Included
4.4 Propose treatment plan to patients and families	9	100%	9	100%	9	100%	8.5	92.9%	Included
4.5 Engage patient and family in making decision of therapy plan (*Engage patients and families in making decision of therapy plan that reflect the their needs, value and goals)	9	96.4%	9	89.3%	9	92.9%	8	85.7%	Included
4.6 Communicate effectively with colleagues	9	96.4%	9	96.4%	9	96.4%	8	89.3%	Included
4.7 Communicate effectively with stuffs in other institutions	9	96.4%	8	85.7%	8	85.7%	7	82.1%	Included
work									
5.1 Collaborate with the members in GP team	9	100%	9	96.4%	9	96.4%	8	92.9%	Included
5.2 Collaborate with other colleagues	9	100%	8	89.3%	8	92.9%	8	89.3%	Included
5.3 Collaborate with stuffs in other institutions	9	100%	8	78.6%	8	92.9%	7	82.1%	Included
5.4 Allocate internal resources of the institution for optimal patient care (*Allocate resources of the institution for optimal patient care)	8	96.4%	8	82.1%	8	89.3%	7	89.3%	Included
▲ 5.5 Allocate external resources of the institution for optimal patient care	8	92.9%	7	71.4%	-	-	-	-	Deleted

● 5.6 Encourage community personnel and social resources to help with community health services	-	-	-	-	9	96.4%	8	89.3%	Included
● 5.7 Mobilize community members and social resources to provide community health services	-	-	-	-	7.5	89.3%	7	82.1%	Included
Professionalism									
6.1 Adhere to the medical rules and regulations strictly	9	100%	9	96.4%	9	100%	9	92.9%	Included
● 6.2 Demonstrate a commitment to patients through clinical excellence and high ethical standards	-	-	-	-	9	100%	9	89.3%	Included
6.3 Adhere to patients' right to know	9	100%	9	96.4%	9	96.4%	9	92.9%	Included
6.4 Adhere to confidentiality and privacy principles	9	100%	9	100%	9	96.4%	9	96.4%	Included
6.5 Have the sense of responsibility	9	100%	8	92.9%	9	100%	8	89.3%	Included
6.6 Self-adjust in the face of challenges	9	100%	8	78.6%	9	100%	8	89.3%	Included
Continuing education, learning and research									
7.1 Teach students	9	96.4%	8	89.3%	8	92.9%	8	92.9%	Included
7.2 Be engaged in practice-based learning and development	9	100%	8	78.6%	9	100%	8	89.3%	Included
7.3 Be engaged in the continuous enhancement of their professional activities through ongoing learning	9	100%	8.5	96.4%	9	100%	9	100%	Included
7.4 Demonstrate an understanding of the scientific principles of research	8	96.4%	8	89.3%	8	89.3%	7	92.9%	Included
7.5 Search, navigate, and evaluate resources and clinical practice guidelines that are relevant to general practice	8	96.4%	8	89.3%	8	92.9%	8	82.1%	Included
7.6 Participate in or conduct researches in general practice	8	89.3%	8	89.3%	8	92.9%	7.5	85.7%	Included

Note: experts rated the importance and feasibility of each indicator on a 1-9 Likert scale (1 = not important/feasible and 9 = very important/feasible).

▲ competencies deleted in the first round due to failure to achieve 75.0% agreement in terms of feasibility

▲▲ competencies deleted in the first round due to experts' recommendation

● items added in the second round

(*) competencies modified in the first round

Table 3. Final competencies in the competency model for general practitioners in China

Domains	Competencies
Knowledge and skills	1.1 Be with in-depth knowledge of clinical medicine
	1.2 Be with in-depth knowledge of general practice
	1.3 Be with in-depth knowledge of public health
	1.4 Be with in-depth knowledge of rehabilitation
	1.5 Be with in-depth knowledge of psychology and sociology
	1.6 Be equipped with the skill of history taking
	1.7 Be equipped with the skill of physical examination
	1.8 Interpret basic clinical tests and images correctly
	1.9 Be equipped with the skill of clinical operation
	1.10 Use electronic health record system effectively
Patient care	2.1 Manage diseases at early stage presenting in an undifferentiated way
	2.2 Manage simultaneously multiple complaints, both acute and chronic health problems in the individual
	2.3 Manage emergency conditions
	2.4 Arrange referrals to specialists when necessary
	2.5 Ensure patient safety
	2.6 Provide advice of rehabilitation when necessary
	2.7 Sign contracts with patients and provide continuous service
	2.8 Provide home visit and follow-up
	2.9 Provide home care when necessary
Public health services	3.1 Organize health education
	3.2 Provide preventive care by vaccination
	3.3 Establish and manage the health files
	3.4 Manage the care of special population in the community (elderly, women, children, disabled, patients with mental illness)
	3.5 Undertake the continuing management of chronic health problems
	3.6 Identify and manage public health emergencies
Communication	4.1 Listen carefully to patients and be empathic
	4.2 Explain things clearly and check for patients and families understanding
	4.3 Discuss with patients and families about their health condition and thoughts
	4.4 Propose treatment plan to patients and families
	4.5 Engage patients and families in making decision of therapy plan that reflect their needs, value and goals
	4.6 Communicate effectively with colleagues
	4.7 Communicate effectively with staffs in other institutions
Team work	5.1 Collaborate with the members in GP team
	5.2 Collaborate with other colleagues
	5.3 Collaborate with staffs in other institutions
	5.4 Allocate resources of the institution for optimal patient care
	5.5 Demonstrate collaborative leadership in professional practice to enhance health care
	5.6 Encourage community personnel and social resources to help with community health services
Professionalism	6.1 Adhere to the medical rules and regulations strictly
	6.2 Demonstrate a commitment to patients through clinical excellence and high ethical standards
	6.3 Adhere to patients' right to know
	6.4 Adhere to confidentiality and privacy principles
	6.5 Have the sense of responsibility
	6.6 Self-adjust in the face of challenges
Education, research and learning	7.1 Teach students
	7.2 Be engaged in practice-based learning and development
	7.3 Be engaged in the continuous enhancement of their professional activities through ongoing learning
	7.4 Demonstrate an understanding of the scientific principles of research
	7.5 Search, navigate, and evaluate resources and clinical practice guidelines that are relevant to general practice
	7.6 Participate in or conduct researches in general practice

Figures

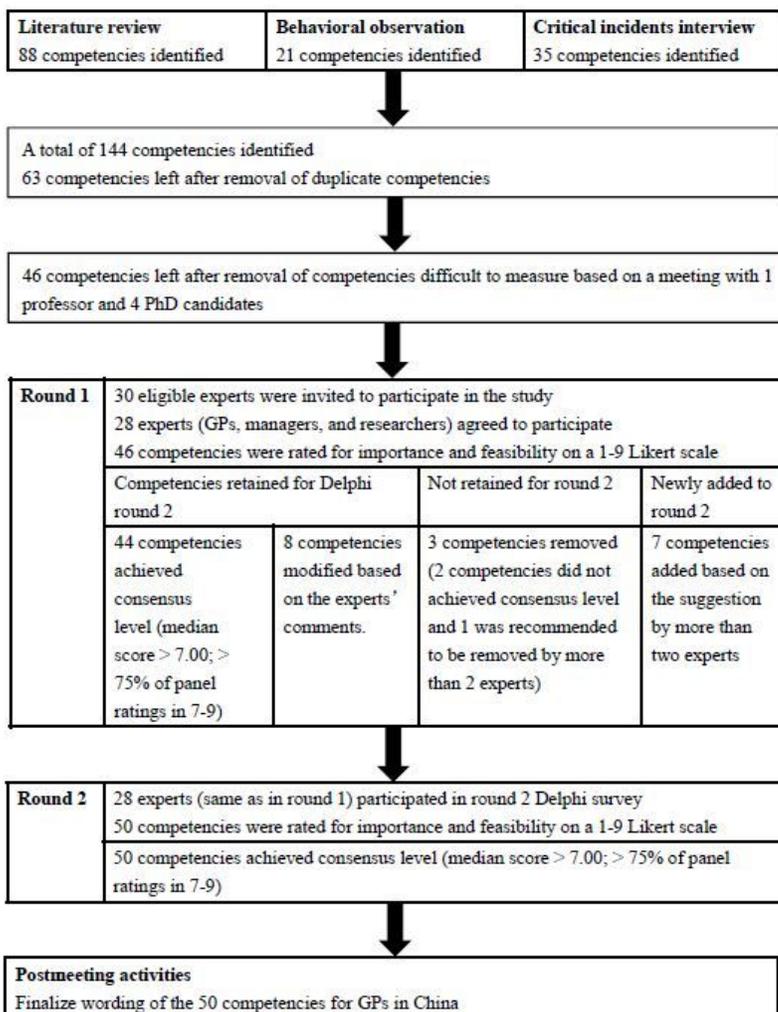


Figure 1

Process of the Delphi study.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Table1.PanelcharacteristicsoftheDelphiprocess.docx](#)
- [Table2.ResultsoftheDelphiprocess.docx](#)
- [Table3.FinalcompetenciesforGPsinChina.docx](#)