

Development of a Performance Measurement System for General Practitioners' Office in China's Primary Healthcare

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Abstract

Background General practitioners are the main providers of primary care services. To better strengthen the important role of general practitioners in primary healthcare services, China is promoting the general practitioners' office system. There is a lack of well-accepted methods to measure the performance of general practitioner offices in China. We thus aim to develop a systematic and operable performance measurement system for evaluating the general practitioner's office.

Methods We establish an index pool of the performance measurement system of general practitioners' offices by a cross-sectional study and the literature research method and adopt the focus group method to establish the preliminary system. The Delphi method is then used to conduct three rounds of consultation to modify indices, which aims to form the final indicator system. We determine the weight of each index by the analytic hierarchy process method, which together with the final indicator system constitutes the final performance measurement system. Finally, we select three offices from three different cities in Sichuan Province, China, as case offices to conduct the field study, aiming to assess its credibility.

Results Our results show that the first office scored 958.5 points, the second scored 768.1 points, and the third scored 947.7 points, which corresponds to the reality of these three offices, meaning that the performance measurement system is effective and manoeuvrable.

Conclusions Our study provides support for standardizing the functions of China's general practitioner's office, improving the health service quality of generalists, and providing a theoretical basis for the standardization of the general practitioner's office.

Background

The Chinese government attaches great importance to the physical health of the people and has put forward the national strategy of Healthy China 2030, which proposes to provide comprehensive and holistic health services for the population by strengthening the primary health service system and building a team of general practitioners.¹ However, in China, due to the late start of medical development and backward concepts, the uneven distribution of medical resources and the mismatch between supply and demand have led to widespread problems such as an imbalance in supply and demand between doctors and patients and difficulty in seeing a doctor.

General practitioners (also known as family doctors) are the main providers of primary care services.² In some developed European countries, general practitioners account for more than 50% of the total number of medical practitioners in the health care system.³ In China, however, the general practitioner system started late, and the proportion of consultations undertaken by general practitioners is still relatively small.³

To better strengthen the important role of general practitioners in primary healthcare services, the general practitioners' office system is being widely implemented across China. The general practitioners' office is the main venue for family doctors contracted in primary health care institutions to provide compliance services. The contracted family doctors provide comprehensive, continuous and one-stop services, such as basic medical care, public health and health management, to the contracted residents through the general practitioners' office, including basic public health services, treatment of common diseases and chronic diseases, appointment booking, convenient referral, joint consultation or remote consultation, health assessment, management plan formulation, follow-up visits, and other compliance services.⁴⁻⁶ The establishment of the general practitioners' office has a positive effect on promoting the focus of medical and health work as well as resources to be placed more at the grassroots level, achieving basic medical and health services for all, and reducing the problems of expensive and difficult access to health care.⁷ However, at present, there are various problems with the construction of general practitioners' offices in China, such as nonuniform construction standards and service processes, a single medical service model, incomplete medical service content and insufficient service levels of family doctors.⁸ Better identification of these problems requires the establishment of a scientific and effective performance measurement system to evaluate the construction of general practitioners' offices.

Countries such as Austria and Poland have optimized the performance of family doctors, the process of collaborative service and other aspects. Standardized assessments are made in the workplace where family doctors provide health services in terms of basic medical services, quality of care, continuity of care, coordination and safety.⁹⁻¹¹ A study from Switzerland showed that after optimizing the interior complements of the primary care office, the level of medical and health services and patient satisfaction improved.¹² Another study in Switzerland showed that the adjustments and optimization of process elements such as the workflow of primary care office, medical training, and the result elements such as degree of satisfaction to evaluate the performance of office have all been recognized.¹³ Additionally, the quality of health services can also be improved by optimizing the physical environment, service mode, team training and communication skills.¹⁴

Establishing a systematic and operable performance measurement system for general practitioners' offices that is suitable for China's reality can gradually standardize the functions of China's primary care institutions, improve the health service quality of generalists, and provide a theoretical basis for the standardization of general practitioners' offices. However, a scientific and effective performance measurement system for evaluating general practitioners' office has not been reported thus far, which is thus the focus of this research.

Methods

A scientific and reliable performance measurement system is developed according to the following four steps. First, we establish an index pool for evaluating the performance of general practitioners' offices by a cross-sectional study and the literature research method.¹⁵ Second, the focus group method is adopted

to organize the personnel who have been engaged in primary care-related work for more than one year to carry out three rounds of discussions, based on which a preliminary performance measurement system is established.¹⁶ Third, the Delphi method is then used to conduct three rounds of consultation for general practice experts with more than 10 years of experience in primary care services, based on which index items are modified further to form the final indicator system.¹⁷ Fourth, we determine the weight of each index by the analytic hierarchy process method, which together with the final indicator system constitutes the final performance measurement system.¹⁸ The four steps are detailed as follows.

2.1 Construction of index pool

The literature research method was used to find relevant indicators for evaluating the performance of general practitioners' offices. We searched for relevant literature between January 1, 2010, and November 8, 2020, from several main academic databases (including PubMed, Web of Science, and CNKI). The keywords used for the literature search included primary health care, family practice, general practitioners, community health centers, community health workers, community health services, chronic disease, chronic disease indicators, quality indicators, and health care. We then identified relevant initial indicators from the references found and put them into the index pool.

Next, a cross-sectional study was conducted to collect the configuration and construction requirements of general practitioners' offices by surveying medical personnel who had been working on primary care services for at least one year in primary care institutions of Sichuan Province, China. We designed structured questionnaires based on the current demands of primary care institutions for construction improvement of general practitioners' offices [8] and sent them to the survey participants by online chatting tools (such as QQ and WeChat groups). The questionnaire includes 5 parts:

- 1) The basic information of the respondent: gender, age, position, educational level, etc.;
- 2) The configuration requirements of general equipment in a general practitioners' office;
- 3) The configuration requirements of the medical equipment in a general practitioner's office;
- 4) The requirements of medical personnel in a general practitioner's office;
- 5) The primary care services provided in a general practitioner's office.

Each requirement or service was represented by a certain option. An option was set as a candidate measurement index and put into the index pool if it was chosen by more than 75% of respondents. The index pool was finally formed by removing duplicated indicators.

2.2 Construction of the preliminary performance measurement system

Three rounds of expert interviews were conducted using the focus group method, with the participation of medical personnel who were currently working on primary care services for one year or more, which aimed to establish the preliminary performance measurement system.^{19,20} The first two rounds of discussions were conducted online, and the third was conducted offline. In each interview, a brief introduction to the research was given, and advice given by experts was obtained. The first round of discussions was to propose the first-level index items, the second round was to propose the second- and third-level items, and the third round was to modify all index items proposed earlier. Each interview lasted approximately one and a half hours, and the details were recorded and documented. After the meetings, the content of the meetings was analysed, and we obtained the preliminary performance measurement system.

2.3 Modification of index items in the performance measurement system

The preliminary performance measurement system was then modified according to the Delphi method, which was a process combining the benefits of expert analysis with elements of the wisdom of crowds.²¹ The consultants consisted of some researchers from Mainland China who had published "General Practitioners' Office"-related research articles and experts and managers with more than 10 years of primary care service experience from primary healthcare institutions in Sichuan Province, China. The questionnaire was designed based on our research objective, in which options such as importance and operability were set under each index item in the preliminary performance measurement system. Experts were asked to score each option on each indicator, with the scores quantified by a Likert scale. The questionnaire also contained an expert authority self-assessment form, which meant that experts were required to score their familiarity with each item and the basis for their judgment. A field of comments at the end of the questionnaire allowed experts to suggest changes to the questionnaire entries.

Three rounds of the Delphi method were conducted, with each round screening the indices of the performance measurement system based on the experts' scores and the comments in the comments field. In addition, each round assessed the authority, motivation and coordination of the experts based on their authority self-assessment form, the recovery rate of the questionnaire and whether there were disagreements among the experts on the items.

In the screening process, indices were selected by statistics according to their importance and operability. First, the arithmetic mean value and variation coefficient of importance and operability of each index were calculated. The inclusion criteria included a mean value > 4.0 and a coefficient of variation < 0.25 , while the exclusion criteria included a mean value < 3.0 and a coefficient of variation > 0.25 . Other indices with mean values between 3.0 and 4.0 needed to be adjusted or deleted after discussion.

2.4 Determination of index weights for the final performance measurement system

The analytic hierarchy process method was used to measure the weight and combination weight of index items.²² Three steps of the AHP methodology are presented below:

Step 1: The first was to define a multilevel hierarchy with items in each level having the same or similar attributes.²³ Based on the previous section, a three-level “hierarchy” was established, which meant that indices with the same magnitude were placed in the same level. For example, first-level indices were placed in the first-level tier.

Step 2: We then made pairwise comparisons of elements at the given level, which aimed to develop a judgment matrix. After that, the consistency parameter was calculated to check whether the judgment matrix was reasonable.

Step 3: The eigenvalues of the judgment matrix were calculated to determine the relative priority or weight of each element relative to each element in the hierarchy.

Step 4: We combined the weights of each index in each level to obtain the final performance measurement system.

Results

This section presents how the aforementioned method is used to develop the performance measurement system for evaluating general practitioners’ offices in China.

3.1 Index pool for evaluating general practitioners’ office in China

Based on the literature research method, the titles and abstracts of relevant papers were summarized and categorized according to the purpose and theoretical basis of this research. A total of 44 indices were finally selected.

In the cross-sectional research, a total of 1,917 questionnaires were collected from medical personnel from 21 cities and prefectures in Sichuan Province, in which 1651 valid questionnaires were identified, and the effective rate was 86.12%. Among the respondents, 1103 (66.8%) were female, and 625 (37.9%) were 36 to 45 years old.

Based on the results of the cross-sectional research, a total of 12 indices were identified, including "appearance of the office", "office size", "facilities & equipment", "interior layout", "staffing", "team building", "content of service", "construction of information system", "appointment service", "referral service", "management of health profiles", and "follow-up service", which are incorporated into the index pool.

After the integration of the results of the literature research and cross-sectional research, 56 index items were initially screened out, and 13 index items with repetitive significance were eliminated. Finally, 40

indices were selected to form the performance measurement system. The index pool is sorted out as follows:

1) Structural dimensions (15 indices): "appearance of the office",²⁴ "construction of information system", "team building",²⁵ "sources of funding",²⁶ "satisfaction",²⁴ "naming", "office size", "facilities & equipment",²⁴ "interior layout", "staffing", "regional healthcare information system",²⁷ "mode of operation", "culture building of team",²⁸ "capacity building of team", "government input".

2) Process dimensions (16 indices): "basic health care", "contract service of family doctor",^{29,30} "public provisioning of health services", "collaborative community-based services",³¹ "quality of service", "telemedicine services",³² "synergy of government",³³ "general medical services", "emergency medical services",³⁴ "health education and advisory services",³⁵ "health management service", "appointment service",^{36,37} "pharmaceutical delivery", "outpatient services", "medication guidance", and "service for long-term prescriptions"³⁵.

3) Result dimensions (11 indices): "income", "income of basic health care", "income of public provisioning of health services", "effective contract rate", "compliance rate", "rate of contract renewal", "contract rate for key populations", "rate of hypertension control",³⁸ "rate of diabetes control",³⁸ "satisfaction of medical staff", "client satisfaction".³⁹

3.2 Preliminary performance measurement system

To establish a preliminary performance measurement system, three single-focus group discussions were conducted in this stage. The first and second focus groups were conducted online, and the third group was conducted on-site. There were 27 focus group members, 16 of whom were male (59.26%) and 15 of whom were over 40 years old (55.55%).

The first discussion lasted 90 minutes with 15 participants. Three first-level indices were determined, including "essential requirement", "health services", and "quality assessment". In addition, the second-level indices corresponding to each first-level index were integrated. The second discussion consisted of 11 participants and lasted 73 minutes. After sorting out the data, 12 second-level indices and 35 third-level indices were preliminarily developed by the research team. The third discussion lasted 90 minutes with 10 participants, and indices at all levels were revised. The preliminary performance measurement system is shown in Appendix 1.

3.3 Modified performance measurement system

An expert team was formed to modify the preliminary performance measurement system, which consisted of 13 consultants from different medical institutions in Chengdu, Shanghai, Chongqing, Beijing, and Shijiazhuang, with 10 experts (77.0%) over 40 years old, the longest working time of 45 years, an average of 21.46 years, and 7 experts (53.8%) with a master's degree or above. After three rounds of discussion through the Delphi method, the performance measurement system of the general practitioner's

office was finally constructed, which contained 10 second-level indices and 37 third-level indices. The 10 second-level indices included "appearance of the office", "construction of information system", "team building", "operational mechanisms", "basic health care", "contract service of family doctor", "collaborative community-based services", "quality of service", "social assessment", and "economic efficiency". The 37 third-level indices are shown in Appendix 2.

The motivation, authority and coordination of the experts were tested after each round of questionnaire return. After calculation, the positive coefficients of the experts in the three rounds were all greater than 0.7, indicating a high positive degree, and the results were reliable. The authority coefficients (Cr) of consultants in the first, second and third rounds were 0.9424, 0.9003 and 0.9499, respectively. The authority coefficients (Cr) were all greater than 0.7, indicating that the authority of consultants was strong and that the results can be accepted. All three rounds of coordination coefficients showed a high degree of coordination of expert opinion after chi-square tests, which indicated the reliability of the results.

3.4 Weights of index items for the final performance measurement system

The results show that the combined weight of basic conditions is 0.2689, the combined weight of health services is 0.3655, and the combined weight of quality performance is 0.3655. The weights of the second- and third-level indices are shown in Appendix 2.

3.5 Assessment of credibility

We selected three representative general practitioners' offices with good primary care facilities and services from three cities (i.e., Chengdu, Bazhong, and Deyang) in Sichuan Province, China, as case offices to conduct the field study and to verify the proposed performance measurement system.

The results of this research showed that the first office scored 958.5 points, the second scored 768.1 points, and the third scored 947.7 points. According to the scores of the three offices, office 1 and office 3 are relatively high, while office 2 is relatively low. Their differences are mainly reflected in indicators such as regional healthcare information system, mode of operation and incentives. According to the analysis, office 2 is located in northeastern Sichuan, where the economic level is relatively low, and information resources are relatively insufficient. Office 1 is in Shuangliu County of Chengdu. The informatization construction and working model of this county are relatively good, which is basically consistent with the results of the performance using the measurement system developed in this research, indicating that this system can better evaluate the construction of general practitioner's offices in primary care institutions. In summary, the performance measurement system is effective and manoeuvrable.

Discussion

The establishment of a performance measurement system is of great importance for the construction of general practitioners' offices. This research selected general practitioners' offices as the research object, which was the first research carried out to construct a comprehensive performance measurement system

of the general practitioner's office from the perspective of the medical staff of Chinese primary care institutions, showing its innovativeness and research value. At present, the current theory and methods for the measurement system of general practitioner's offices are not yet mature in China, and the system models and quality measurement systems of general practitioner's offices implemented in various regions in China are also different. Our research started from the perspective of the management of primary care institutions, referring to the advanced experience and practices of the evaluation criteria of general practitioners' offices from various countries, and finally established a scientific, rigorous and manoeuvrable performance measurement system, which ultimately achieved the goal of improving the abilities of healthcare services from general practitioners in general practitioners' offices. It will also provide a reference for promoting the construction of general practitioner's offices.

The rationality of the performance measurement system developed is mainly threefold. First, the method for index pool construction is reasonable. Semlitsch et al.⁹ constructed the quality measurement system of Austrian primary care institutions by constructing the index pool based only on the existing index database. This research constructs the index pool based on both the literature research and the analysis of 1651 quantitative data, which makes the measurement system more manoeuvrable and reliable. Second, our constructed indices are comprehensive and reasonable. Our indices cover not only the evaluation of service quality for related diseases but also the evaluation of various basic public health service items stipulated by related authorities in China. Third, the dimensions of our performance measurement system are comprehensive. It considers not only the process dimension that is commonly considered in previous related studies but also the structural dimension and result dimension, which have seldom been reported in the literature.⁴⁰ The completeness of the constructed performance measurement system is helpful to ensure the rationality of the measurement system.

This research has two possible limitations. First, in our literature search and analysis, we have not considered the data from gray literature, newspapers, or reports, which may lead to an incomplete index pool, although our index pool has been validated and confirmed by several rounds of expert consultation. Second, the effectiveness and rationality of the performance measurement system has only been validated in three cities. Due to various differences in different cities and regions, such as medical resources, economic levels, and geographic environments, it is worth further verifying the reliability and validity of this system in more cities.

Conclusion

This research constructs a comprehensive, scientific and operable performance measurement system of the general practitioner's office based on the focus group method, Delphi method, and analytic hierarchy process. The performance measurement system is helpful to assess and establish general practitioners' offices more effectively, which is important to the primary health service system in China. It is also helpful to improve the delivery of quality primary care services.

Declarations

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Authors' contributions

CL and WR were involved in the implementation of the whole work and the writing of the results, XL and YL was involved in the design of the whole study, XL supervised the work, HC and YZ were involved in data collection and collation. ZG and YL participated in revising the manuscript. CL and WR contributed equally to this paper. All authors read and approved the final manuscript.

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Ethics approval and consent to participate

Biomedical Ethics Committee of West China Hospital, Sichuan University approved this study. The reference number is 2019-1208. All methods were performed in accordance with the relevant guidelines and regulations. Informed consent was obtained from all participants.

Consent for publication

Not applicable

Availability of data and materials

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

Competing interests

The authors declare that they have no competing interests.

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