

Postprint: Evaluation Indicators for Professional Competency of General Practitioners in Less Developed Regions

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Abstract

Objective To construct an indicator system for evaluating the job competency of general practitioners in underdeveloped areas, providing a reference basis for the training, assessment, and evaluation of general medical talent in such regions. **Methods** From January 2021 to June 2021, using purposive sampling, 18 consulting experts were selected from personnel familiar with the frontiers of general medicine, those engaged in general medicine practice and administration, and general practitioners who had been assigned to posts in underdeveloped areas through the east-west paired assistance program. The literature research method, Delphi method, and analytic hierarchy process were employed to complete the screening of evaluation indicators for the job competency of general practitioners in underdeveloped areas and the determination of their respective weights. **Results** An evaluation indicator system for the job competency of general practitioners in underdeveloped areas was established, comprising 4 first-level indicators, 20 second-level indicators, and 44 third-level indicators. The weights of the first-level indicators—medical service capability, public health service capability, organizational management and service coordination capability, and professional competence—were 0.3509, 0.1091, 0.1891, and 0.3509, respectively. The top four second-level indicators were professional quality, learning and thinking ability, communication and coordination, and diagnosis and treatment of common and frequently occurring diseases. The top four third-level indicators were civilized communication and friendly exchange, humanistic care, clinically appropriate technology, and diagnosis and treatment of common and frequently occurring diseases. **Conclusion** This study constructed an evaluation indicator system for the job competency of general practitioners in underdeveloped areas, which can provide a scientific basis for the continuous quality improvement of the evaluation system for general practitioners' job competency in these regions.

Full Text

Study on Evaluation Indicators for General Practitioners' Post Competency in Underdeveloped Areas

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Abstract

Objective: To construct an indicator system for evaluating general practitioners' post competency in underdeveloped areas, providing a reference basis for the training, assessment, and evaluation of general practice talent in these regions.

Methods: Between January and June 2021, 18 consulting experts were selected using purposive sampling from three groups: (1) professionals familiar with frontiers in general medicine, (2) practitioners engaged in general medicine practice and administration, and (3) general practitioners from eastern China who had served in underdeveloped areas through east-west paired assistance programs. The study employed literature research, Delphi method, and Analytic Hierarchy Process (AHP) to screen evaluation indicators and determine their weights.

Results: The competency evaluation indicator system for general practitioners in underdeveloped areas comprises 4 first-level indicators, 20 second-level indicators, and 44 third-level indicators. The weights for the first-level indicators were: medical service capacity (0.3509), public health service capacity (0.1091), organizational management and service coordination ability (0.1891), and professionalism (0.3509). The top four second-level indicators by combined weight were professional quality, learning and thinking ability, communication and coordination, and diagnosis and treatment of common diseases. The top four third-level indicators were civilized communication and friendly exchange, humanistic care, clinical appropriate technology, and diagnosis and treatment

of common diseases.

Conclusion: This study constructed a competency evaluation indicator system tailored for general practitioners in underdeveloped areas, which can provide a scientific basis for continuous quality improvement of competency evaluation systems in these regions.

Keywords: Underdeveloped areas; General practitioners; Post competency; Evaluation indicators

Introduction

Competency refers to the personal characteristics that distinguish outstanding performers from average ones in the workplace. Post competency represents the comprehensive set of qualities required for an individual to excel in a specific position. While numerous studies have developed indicator systems or models to evaluate post competency, no unified standard exists. The consensus is that indicators should encompass not only explicit measures like knowledge and skills but also implicit dimensions such as self-concept, motivation, and traits.

General practitioners play a pivotal role in tiered healthcare delivery systems, and their competency ensures the fulfillment of basic medical needs. International research has produced mature competency indicator systems, including Europe's "WONCA Tree Model," the American ACGME framework, the British RCGP model, the Canadian College of Family Physicians (CFPC) model, and the Australian Royal Australian College of General Practitioners (RACGP) framework. Notably, the American Academy of Family Physicians (AAFP) and the National Rural Health Association (NRHA) have proposed a rural general practitioner competency model that addresses the unique characteristics of rural healthcare—such as insufficient medical resources and lower professional standards—distinguishing it from the core competencies required by ACGME.

Domestic research on general practitioner competency evaluation has primarily focused on economically developed eastern regions. However, China's uneven distribution of medical resources and unbalanced development necessitates distinct competency frameworks for rural or underdeveloped areas. Underdeveloped areas in China represent a historical and dynamic concept, generally referring to regions with lower socioeconomic development levels. According to Yang Yan et al.'s 2021 assessment using the "Indicator System for Underdeveloped Areas in China's New Development Stage," 15 regions including Gansu, Heilongjiang, Hebei, Jilin, Sichuan, Guizhou, Tibet, and Xinjiang were identified as underdeveloped. These regions face challenges including insufficient medical resources, uneven distribution, poor implementation of tiered diagnosis and treatment, and inefficient operation of primary healthcare institutions. Consequently, general practitioners in these areas require a tailored competency evaluation system.

Medical assistance through east-west paired support programs has been crucial

in poverty alleviation efforts. Addressing the difficulties of accessing affordable, quality healthcare requires not only technical support but also strengthening primary healthcare workforce capacity. Enhancing general practitioners' competency represents the foundation for ensuring basic medical services. This study, conducted in Qianxinan Prefecture, Guizhou Province and Daliangshan Prefecture, Sichuan Province, aims to construct a competency evaluation indicator system for general practitioners in underdeveloped areas, providing a basis for their training, assessment, and evaluation.

Methods

1.1 Study Subjects Between January and June 2021, we selected 18 consulting experts through purposive sampling from: (1) general practitioners engaged in clinical work in underdeveloped areas (Qianxinan Prefecture, Guizhou and Daliangshan Prefecture, Sichuan), (2) practitioners involved in general medicine practice and administration at prefecture, county, and township levels, and (3) eastern region general practitioners who had served in underdeveloped areas through east-west paired assistance programs. Selection criteria included: (1) minimum five years of experience in general medicine theory, practice, or management; (2) thorough understanding of primary general practice services or at least three months of medical assistance experience in western township health centers; and (3) willingness to actively participate and complete both rounds of Delphi consultation. The final panel comprised 18 experts: 3 engaged in primary healthcare management at prefecture and county health administrative departments, 6 general practitioners involved in general medicine theory and practice at prefecture-level hospitals, 2 county-level hospital general practitioners, 2 eastern region general practitioners with over three months of service experience in Qianxinan Prefecture township health centers, and 5 general practitioners providing services in township health centers.

1.2.1 Literature Research We searched Wanfang, CNKI, VIP, PubMed, Web of Science, and other online resources for articles related to general practitioner competency evaluation published between 2005 and 2021. English searches combined terms including "General Physician" or "Family Doctor" with "competence indicators" or "responsibility." Chinese searches used keywords such as "全科医师/生," "胜任力," "指标," and "模型." We specifically categorized competency indicators for "township, rural, village, and border ethnic area general practitioners" or "rural general practitioner." After collecting domestic and international competency evaluation indicators, our research team conducted preliminary discussions to develop a draft indicator system for underdeveloped areas.

1.2.2 Survey Reliability and Validity Questionnaire reliability was assessed using internal consistency tests, calculating Cronbach' s α coefficient

for the overall indicator system. A Cronbach' s $\alpha > 0.7$ was considered acceptable reliability. Validity was evaluated using Kaiser-Meyer-Olkin (KMO) test, with $KMO > 0.6$ indicating acceptable validity. The questionnaire achieved a Cronbach' s α of 0.839, demonstrating good internal consistency, and a KMO value of 0.882, indicating good validity.

1.2.3 Delphi Method We conducted two rounds of expert consultation. The first round included background and objectives, expert demographics, and assessments of familiarity and judgment basis. Indicators were rated on a 5-point Likert scale: 1 (very unimportant), 2 (unimportant), 3 (neutral), 4 (important), and 5 (very important). Open-ended questions allowed for suggestions. The second round presented first-round results and asked experts to re-score the revised indicators, aiming to determine final weights. Through these two rounds, we established the competency evaluation indicators for general practitioners in underdeveloped areas.

1.2.4 Analytic Hierarchy Process Analytic Hierarchy Process (AHP) is a systematic, hierarchical analysis method combining qualitative and quantitative approaches. Its fundamental principle involves constructing matrices for pairwise comparisons to determine relative importance among elements while checking consistency across hierarchical levels. The yaahp software was utilized for AHP calculations.

1.3 Statistical Analysis Data entry used Excel 2016, while statistical analysis employed SPSS 23.0. We calculated arithmetic means, standard deviations, and coefficient of variation for each indicator' s importance. The yaahp software computed indicator weights and conducted consistency tests. Chi-square tests compared count data, with $P < 0.05$ considered statistically significant.

Results

2.1 Expert Demographics All 18 experts participated: 8 male and 10 female, with a mean age of 37.8 years and average work experience of 13.4 years. Educational backgrounds included 2 junior college (11.1%), 12 bachelor' s (66.7%), and 4 master' s degrees (22.2%). Professional titles comprised 6 junior (33.3%), 7 intermediate (38.9%), 4 deputy senior (22.2%), and 1 senior (5.6%). Five experts held dual roles in hospital management and clinical practice, 3 served as general practice base directors or teaching secretaries, and 2 were eastern region general practitioners with township health center service experience.

2.2 Expert Participation Rate Both rounds distributed 18 questionnaires, receiving 18 valid responses each, yielding 100% response rate and demonstrating high expert engagement.

2.3 Expert Authority Expert authority was represented by the authority coefficient (Cr), calculated as $Cr = (Ca + Cs)/2$, where Ca is the judgment basis coefficient and Cs is the familiarity coefficient. Familiarity was rated on a 5-level scale: very unfamiliar (0.1), unfamiliar (0.3), neutral (0.5), familiar (0.7), and very familiar (0.9). Judgment basis comprised theoretical analysis, practical experience, domestic/international references, and subjective judgment, each rated as small, medium, or large. The first-round consultation yielded familiarity, judgment, and authority coefficients of 0.76, 0.84, and 0.80, respectively. Coefficients > 0.7 are generally considered indicative of good expert authority.

2.4 Expert Consensus Consensus was measured using Kendall's coordination coefficient (W), which reflects disagreement among experts. W values were 0.24 and 0.26 for the two rounds, with the second-round difference being statistically significant ($P < 0.01$).

Table 1. Consistency Analysis of Two-Round Expert Consultation

Round	χ^2 value	P value	Note: W = Kendall's coordination coefficient
1	<0.001	<0.001	
2	<0.001	<0.001	

2.5 Indicator System and Weight Determination Delphi Method: We used Delphi expert scoring to calculate weights, converting relative importance into points: very unimportant (1), unimportant (2), neutral (3), important (4), and very important (5). First-round indicators meeting three criteria were retained: (1) mean importance score ≥ 3.50 , (2) coefficient of variation ≤ 0.25 , and (3) full-score ratio $\geq 20.0\%$. These formed the basis for the second-round questionnaire, where experts rescored revised indicators and provided additional feedback. Comprehensive analysis of both rounds finalized the indicator system.

Analytic Hierarchy Process: AHP determined hierarchical indicator weights through pairwise comparisons. The Saaty scale assigned importance levels based on mean differences (d) between any two indicators: $d = 0 \rightarrow$ scale 1; $0.1 < d \leq 0.2 \rightarrow$ scale 3; $0.3 < d \leq 0.4 \rightarrow$ scale 5; $0.5 < d \leq 0.6 \rightarrow$ scale 7; $d > 0.7 \rightarrow$ scale 9; intermediate values used scales 2, 4, 6, or 8. Using yaahp software, we constructed hierarchical models, assigned relative importance values through difference d, and automatically generated consistency ratios (CR). After passing consistency tests, the software calculated indicator weights and combined weights across all levels. The final competency evaluation indicators and their weights are presented in Table 2.

Discussion

Western China's underdeveloped regions face persistent gaps in medical resources and technology compared to eastern developed areas, with unbalanced healthcare development likely to continue for the foreseeable future. Currently, no universal general practitioner competency indicator system covers all regions nationwide. China may require two parallel competency evaluation systems with different emphases: one focusing on comprehensive GP development, and another emphasizing competency under resource constraints.

Our evaluation indicators incorporate core elements from authoritative international frameworks, including WONCA's requirements for "person-centered care" and "primary care management," ACGME's emphasis on "interpersonal communication skills" and "professionalism," and RCGP's focus on "health promotion," "team collaboration," and "organization and management." The system also integrates findings from China's developed coastal regions, incorporating top-ranked domestic indicators such as "basic medical services," "basic public health services," "communication," and "clinical basic skills."

The weight distribution reflects the importance of core competencies: first-level indicators medical service capacity and professionalism; second-level indicators professional quality, learning/thinking ability, communication/coordination, and common disease diagnosis/treatment; and third-level indicators humanistic care, clinical appropriate technology, autonomous learning, and team collaboration. These weights underscore their central role in the competency framework.

This study's innovation lies in incorporating competencies specific to rural or non-urban settings, as identified in developed countries and limited domestic research. The AAFP and NRHA rural competency model emphasizes "job adaptability and ability to overcome difficulties and seek community support." Canadian research highlights that rural GPs' comprehensive medical service capacity, communication skills, and self-improvement abilities are crucial due to rural communities' isolation and limited resources. A Japanese study identified 14 competencies for non-urban areas, with 5 distinct from urban requirements: (1) effective judgment in utilizing limited medical resources, (2) establishing appropriate interpersonal relationships, (3) understanding surrounding medical institutions, (4) playing supportive roles in patients' lives, and (5) making decisions based on patient backgrounds. Domestic research has also addressed these issues, particularly for rural, township, and border ethnic regions. Liu Changchang et al. proposed "flexible work patterns and time management" and "proactive service and stress resistance" based on underdeveloped areas' geographic remoteness and large service radii. Zou Haiyan et al. suggested "professional identity and organizational belonging" to address low social status, compensation, and job satisfaction leading to high turnover intentions. Su Fang et al. emphasized "flexible service delivery" and "grassroots communication skills" to accommodate residents' weak health literacy, poor compliance, and local di-

affects/cultural practices. Yin Zhuping et al. identified “cost-effective rational treatment decision-making” for Yunnan’ s border ethnic regions with low economic levels, which our study synthesized as “medical economic decision-making capacity.”

Our evaluation framework more accurately reflects the realities facing general practitioners in China’ s underdeveloped and rural areas: limited resources, insufficient capacity, unique primary healthcare objectives, and inadequate infrastructure. Building upon basic medical and public health service capacities, our system particularly emphasizes stress management, problem-solving abilities, communication skills, adaptability, and flexible work arrangements. Many underdeveloped regions are ethnic minority areas where GPs must understand local traditional culture and leverage indigenous knowledge to communicate with residents. Under resource constraints, they must overcome difficulties to seek social support, arrange flexible work schedules according to local healthcare characteristics, and maintain job commitment and organizational belonging. These underdeveloped area-specific indicators represent our study’ s innovative contribution.

This competency evaluation system, tailored to the healthcare characteristics of underdeveloped regions, can inform the selection, training, and assessment of general practice talent in these areas. However, limited by research conditions, this study focused on Qianxinan Prefecture in Guizhou and Daliangshan Prefecture in Sichuan, leaving room for improvement in coverage and representativeness. Future research should focus on establishing objective quantitative standards for these indicators and applying them to 360-degree evaluation and continuing education program guidance.

Author Contributions

Dongdong Zhou contributed to conceptualization, study design, data collection and analysis, interpretation of results, and manuscript writing and revision. Xuhua Ge contributed to implementation and feasibility analysis, quality control, and overall supervision.

Conflict of Interest: The authors declare no conflict of interest.

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