

Post-print of a survey study on community health management capabilities of rural doctors in China

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Abstract

Background Village doctors (hereinafter referred to as village doctors), as health “gatekeepers” for rural residents, are the primary providers of health management services for rural populations, and their community health management capacity directly affects the health status of rural residents. **Objective** To investigate the current status of health management capacity among village doctors in China, explore strategies for improving village doctors’ community health management capacity, and provide evidence for strengthening the village doctor workforce. **Methods** In August 2020, using a combination of multi-stage stratified cluster sampling and typical sampling methods, a total of 3,916 village doctors were selected from 5 provinces across the eastern, central, and western regions of China. Survey questionnaires were distributed to village doctors through the “Wenjuanxing” platform, covering village doctors’ possession of health management capacity for children, women, elderly, and chronic disease patients, as well as whether these capacities met work requirements, all self-assessed by the village doctors. **Results** Among the 3,916 village doctors, 3,494 (89.22%), 3,175 (81.08%), 3,775 (96.40%), and 3,738 (95.45%) possessed health management capacity for children, women, elderly, and chronic disease patients, respectively. In terms of gender, female village doctors had higher possession rates than male village doctors in family planning guidance, pregnancy health guidance, prevention and treatment of perimenopausal diseases, screening capacity for common gynecological diseases, and overall women’s health management capacity ($P<0.05$); male village doctors had higher possession rates than female village doctors in identification and management methods for critical conditions of common chronic diseases, capacity for stable-phase treatment and complication prevention of common chronic diseases, and overall chronic disease patient health management capacity ($P<0.05$). In terms of practice qualifications, licensed (assistant) physicians had higher possession rates than rural doctors and

other/unqualified village doctors in prevention and treatment of perimenopausal diseases ($P < 0.0083$), and higher possession rates than rural doctors in overall women's health management capacity ($P < 0.0083$); general practitioners had higher possession rates than rural doctors in capacity for preventing functional decline in the elderly ($P < 0.0083$). In terms of education level, those with bachelor's degree or above had higher possession rates than those with college diploma in capacity for stable-phase treatment and complication prevention of common chronic diseases ($P < 0.017$). Village doctors in eastern regions had higher rates of meeting actual work requirements than those in central and western regions in physical examination guidance and common disease screening capacity, with central regions higher than western regions ($P < 0.017$); village doctors in eastern and central regions had higher rates of meeting actual work requirements than those in western regions in health and self-care ability assessment, identification and intervention of negative emotions, and capacity for preventing functional decline ($P < 0.017$). Conclusion Village doctors in China basically possess health management capacity; female village doctors have greater advantages in providing women's health management services; village doctors with rural doctor qualifications have insufficient health management capacity for certain key populations; the ability of village doctors in western regions to meet actual work requirements for elderly health management is relatively poor; active measures should be taken to improve village doctors' competence and promote the stability and sustainable development of the village doctor workforce.

Full Text

Investigation on Community Health Management Ability of Rural Doctors in China

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Abstract

Background: As the gatekeepers for rural residents' health, rural doctors are the main providers of health management services for rural populations. Their

community health management ability directly affects the health level of rural residents. **Objective:** This study aims to investigate the current status of health management ability of rural doctors in China and explore strategies for enhancing their community health management ability, thus providing a basis for strengthening the building of a rural doctor team. **Methods:** In August 2020, a multi-stage stratified cluster sampling and purposive sampling methods were used to select 3,916 rural doctors from five provinces in east, central, and western China. Rural doctors were surveyed using an online questionnaire platform called “Wenjuanxing”. The questionnaire content included the rural doctors’ ability to manage the health of children, women, elderly, and chronic disease patients, and the degree to which these needs were met, all of which were self-evaluated by the rural doctors. **Results:** Of the 3,916 rural doctors surveyed, 3,494 (89.22%), 3,175 (81.08%), 3,775 (96.40%), and 3,738 (95.45%) were found to have the ability to manage the health of children, women, the elderly, and patients with chronic diseases, respectively. The ability of female rural doctors to provide family planning guidance, prenatal health guidance, prevention and treatment of menopause-related diseases, and screening for common gynecological diseases was better than that of male rural doctors ($P < 0.05$); while male village doctors had a higher rate of identifying and handling common chronic disease critical conditions, stable and regular treatment of common chronic diseases, prevention of complications, and health management abilities for chronic disease patients compared to female village doctors ($P < 0.05$).

Rural doctors with qualifications of medical practitioners or assistant medical practitioners had a higher proportion of those with the ability to prevent and treat menopause-related diseases than those with qualifications of rural practitioners and other qualifications ($P < 0.0083$). Rural doctors with qualifications of medical practitioners or assistant medical practitioners had a higher proportion of those with the ability to manage women’s overall health than those with qualifications of rural practitioners ($P < 0.0083$). Rural doctors with qualifications of general practitioners had a higher proportion of those with the ability to manage the functional decline of the elderly than those with qualifications of rural practitioners ($P < 0.0083$). Rural doctors with a bachelor’s degree or above had a higher proportion of those with the ability to provide stable-period treatment and prevention of chronic diseases than those with a junior college diploma ($P < 0.017$). Rural doctors in the eastern region of China had a higher proportion of those whose ability to guide the physical examination and screening for common diseases of the elderly meets the actual work needs than those in the central and western regions, and the proportion in the central region was higher than that in the western region, with statistically significant differences ($P < 0.017$). Rural doctors in the eastern and central regions of China had a higher proportion of those whose ability to assess the health and self-care ability of the elderly, identify and intervene with negative emotions, and prevent functional decline met the actual work needs than those in the western region ($P < 0.017$). **Conclusion:** At present, rural doctors in China basically have the ability to manage health, and female rural doctors have an advantage in

providing women's health management services. However, rural doctors with qualifications of rural practitioners lack the ability to manage the health of some specific key populations, and the ability of rural doctors in the western region to manage the health of the elderly is relatively poor. Therefore, active measures should be taken to improve the quality of rural doctors and promote the stability and sustainable development of the rural doctor team.

Keywords: Rural doctors; Rural health services; Health management; Clinical competence; Public health services

Rural doctors (hereinafter referred to as village doctors) serve as primary health-care workers in China, representing important providers of health services for rural residents and a core force driving the development of rural health undertakings [1]. With economic development and social transformation, rural society is experiencing increasingly prominent aging and “empty nest” phenomena, while the disease spectrum has shifted from acute and infectious diseases to chronic non-communicable diseases [2]. These changes in rural population structure have not only altered the demand for health services but also transformed the content of service needs—most acute disease patients now seek treatment at higher-level medical institutions, while health management services such as chronic disease management and elderly care have become the main content of village-level health services and a rigid demand for rural residents [3]. These changes impose new requirements on rural primary health services: to conduct health management targeting key populations including the elderly, chronic disease patients, women, and children, and to provide targeted health education and guidance based on their specific health problems, continuously improving residents' health through health monitoring, assessment, and intervention [4-5]. As the main providers of basic medical and public health services in rural areas, village doctors' health management capabilities play a crucial role in improving residents' health status and quality of life [6]. This study investigates the current status, characteristics, and main deficiencies of village doctors' health management service capabilities in China, and explores strategies for improving these capabilities to provide policy basis and decision-making support for strengthening village doctor team construction.

1.1 Study Subjects

In August 2020, our research team conducted an online questionnaire survey among village doctors in eastern, central, and western China using multi-stage stratified cluster sampling combined with purposive sampling. Based on the current status of the primary health workforce, socio-economic development levels, and primary health service delivery, we selected Zhejiang and Jiangsu provinces (eastern region), Anhui and Henan provinces (central region), and Gansu Province and Chongqing Municipality (western region) as survey sites. Considering economic development levels, population size, and geographical lo-

cation, we selected two prefecture-level cities (one moderately high and one moderately low) in each sample province, and one urban district and one county (city) in each sample city following the same principle. All village doctors in the sample districts/counties were surveyed. We also included doctors whose workplace was in township health centers or community health service centers but whose practice qualification was village doctor, while excluding public health practitioners, nurses, and others who did not directly provide medical services and health management services in village clinics. Due to COVID-19 prevention and control measures, the survey in Zhejiang Province could not be conducted, and the sample size in Jiangsu Province was doubled.

This study was approved by the Ethics Committee of Nanjing Medical University [Ethics Approval No.: NMU Ethics Review (2020) 589], and all participants signed informed consent forms. The survey was conducted through the “Wenjuanxing” platform, with 4,308 questionnaires distributed to village doctors. After excluding 392 questionnaires from unwilling participants and invalid responses, 3,916 valid questionnaires were collected, yielding an effective response rate of 90.90%.

1.2.1 Survey Tools

Based on the “Family Doctor Health Service Capability Indicator System” developed by our research team [7], we compiled a self-assessment questionnaire for village doctors’ capabilities, covering basic information and self-evaluation of four capability dimensions: medical services, public health services, organizational management and service coordination, and professional competence. This study focused on analyzing village doctors’ capabilities in public health services, specifically health management for four key populations: children, women, elderly, and chronic disease patients. The questionnaire assessed whether village doctors possessed these capabilities, actual work requirements, and whether their capabilities met work needs.

To determine whether village doctors possessed health management capabilities for specific populations, we established evaluation indicators and criteria through expert consultation and research group discussion, as shown in Table 1. To further analyze village doctors’ elderly health management capabilities, we used the indicator “proportion of village doctors mastering specific health management service items for certain populations that meet actual work needs,” calculated as: $(\text{number of village doctors whose specific health management capability for a certain population meets actual work needs} / \text{number of village doctors who need to provide that specific health management capability in actual work}) \times 100\%$.

In the basic information section of the questionnaire, practice qualification categories were set as multiple-choice questions to reduce errors by doctors with additional practice qualifications. For analysis, practice qualifications were divided into four categories: practicing (assistant) physicians, general practitioners, ru-

ral doctors, and other/no qualification. Considering that some village doctors with practicing (assistant) physician qualifications had also obtained general practitioner transition training certificates or additional general practitioner practice qualifications—meaning they practically possessed general practitioner capabilities—we categorized any village doctor who selected both “practicing (assistant) physician” and “general practitioner” or only “general practitioner” as “general practitioner.” Those who selected both “rural doctor” and “general practitioner” or only “rural doctor” were categorized as “rural doctor.”

1.2.2 Questionnaire Distribution and Quality Control Methods

The survey team consisted of teachers and students majoring in health administration who underwent unified training before being qualified to conduct surveys at five sites: Jiangsu, Anhui, Henan, Gansu, and Chongqing. Surveyors contacted coordinators at sample district/county health commissions and used the “Wenjuanxing” platform to distribute questionnaires to participants. All questionnaires were completed online. After submission, surveyors reviewed the completeness and logical consistency of responses. The survey was conducted anonymously, with an informed consent form at the beginning of each questionnaire. Participants who were unwilling to participate could exit automatically, while willing participants were also asked to provide contact information for questionnaire verification.

1.3 Statistical Methods

SPSS 22.0 statistical software was used for analysis. Measurement data were expressed as ($\bar{x}\pm s$), and count data as frequency and percentage. Chi-square tests were used for comparisons between groups, with a test level of 0.05 for two-group comparisons. For multiple pairwise comparisons, the Bonferroni method was used to adjust the test level: 0.017 for three-group comparisons and 0.0083 for four-group comparisons.

2.1 Basic Information of Village Doctors

Among the 3,916 village doctors, 859 (21.94%) were from the eastern region, 1,963 (50.12%) from the central region, and 1,094 (27.94%) from the western region. In terms of gender, 2,748 (70.17%) were male, with 1,502 (76.52%) and 790 (72.21%) male doctors in the central and western regions, respectively. Regarding age, the average age of surveyed village doctors was (47.9 ± 7.8) years, concentrated in the 25-44 and 45-59 age groups, with 1,292 (32.99%) and 2,367 (60.44%) doctors, respectively. In terms of education, most village doctors had high school/technical secondary school or below (2,813, 71.83%), with 650 (75.67%), 1,479 (75.34%), and 684 (62.52%) in eastern, central, and western regions, respectively. Only 113 (2.89%) had bachelor’s degree or above, with 38 (4.42%), 53 (2.70%), and 22 (2.01%) in eastern, central, and western regions, respectively. Regarding practice qualifications, 1,512 (38.61%) were practicing (assistant) physicians, with 318 (29.07%) in the western region, while 2,067

(52.78%) were rural doctors, with 696 (63.62%) in the western region. There were statistically significant differences in gender, age, education, and practice qualifications among village doctors in eastern, central, and western regions ($P < 0.05$), as shown in Table 2 .

2.2.1 Children's Health Management Ability of Village Doctors

Among the 3,916 village doctors, 3,622 (92.49%) possessed children's nutrition guidance capability and 3,629 (92.67%) possessed children's physical examination capability, with 3,494 (89.22%) possessing overall children's health management capability. There were no statistically significant differences in the possession rates of children's nutrition guidance, physical examination, or overall health management capabilities among village doctors of different genders, ages, education levels, or practice qualifications ($P > 0.05$), as shown in Table 3 .

2.2.2 Women's Health Management Ability of Village Doctors

Among the 3,916 village doctors, 3,524 (89.99%) possessed family planning guidance capability, 3,512 (89.68%) possessed prenatal health guidance capability, 3,137 (80.11%) possessed menopause-related disease prevention and treatment capability, and 2,781 (71.02%) possessed common gynecological disease screening capability, with 3,175 (81.08%) possessing overall women's health management capability. Female village doctors had higher possession rates than male doctors in family planning guidance, prenatal health guidance, menopause-related disease prevention and treatment, gynecological disease screening, and overall women's health management capability ($P < 0.05$). Village doctors with practicing (assistant) physician qualifications had higher possession rates of menopause-related disease prevention and treatment capability than those with rural doctor and other/no qualifications ($P < 0.0083$), and higher overall women's health management capability than those with rural doctor qualifications ($P < 0.0083$), as shown in Table 4 .

2.2.3 Elderly Health Management Ability of Village Doctors

Among the 3,916 village doctors, 3,864 (98.67%) possessed physical examination guidance and common disease screening capability, 3,842 (98.11%) possessed health and self-care ability assessment capability, 3,764 (96.12%) possessed negative emotion identification and intervention capability, and 3,694 (94.33%) possessed functional decline prevention capability, with 3,775 (96.40%) possessing overall elderly health management capability. Village doctors with general practitioner qualifications had higher possession rates of elderly functional decline prevention capability than those with rural doctor qualifications ($P < 0.0083$), as shown in Table 5 .

2.2.4 Chronic Disease Patient Health Management Ability of Village Doctors

Among the 3,916 village doctors, 3,846 (98.12%) possessed common chronic disease clinical diagnosis basis capability, 3,767 (96.20%) possessed common chronic disease risk factors and intervention methods capability, 3,698 (94.43%) possessed common chronic disease critical condition identification and management capability, and 3,725 (95.12%) possessed common chronic disease stable period treatment and complication prevention capability, with 3,738 (95.45%) possessing overall chronic disease patient health management capability. Male village doctors had higher possession rates than female doctors in common chronic disease critical condition identification and management, stable period treatment and complication prevention, and overall chronic disease patient health management capability ($P < 0.05$). Village doctors with bachelor's degree or above had higher possession rates of common chronic disease stable period treatment and complication prevention capability than those with junior college education ($P < 0.017$), as shown in Table 6 .

2.3 Elderly Health Management Ability Meeting Work Needs

Given the prominent population aging problem in rural areas and the high demand for elderly health management services, this study analyzed the degree to which village doctors' elderly health management capabilities meet actual work needs. The results showed that among village doctors who needed to provide elderly physical examination guidance and common disease screening, health and self-care ability assessment, negative emotion identification and intervention, and functional decline prevention in their actual work, the proportions whose capabilities met actual work needs were 3,695 (95.87%), 3,674 (95.48%), 3,577 (94.06%), and 3,513 (92.96%), respectively.

Eastern region village doctors had higher rates of meeting actual work needs in physical examination guidance and common disease screening than those in central and western regions, with central region higher than western region ($P < 0.017$). Eastern and central region village doctors also had higher rates of meeting actual work needs in health and self-care ability assessment, negative emotion identification and intervention, and functional decline prevention than western region doctors ($P < 0.017$), as shown in Table 7 .

3.1 Village Doctors in China Basically Possess Health Management Ability

The survey shows that village doctors in China are mainly concentrated in the \$45 age group, indicating an aging trend in the workforce. Educational attainment is predominantly high school/technical secondary school or below, with a low proportion of practicing (assistant) physicians, suggesting generally low qualifications. However, regarding health management capability possession for key populations, village doctors' possession rates for children, women, elderly,

and chronic disease patients reached 89.22%, 81.08%, 96.40%, and 95.45%, respectively. Specific health management capabilities for children, elderly, and chronic disease patients all exceeded 90%, while women's health management capability was relatively lower, possibly related to the higher proportion of male doctors and greater professional skill requirements for some services. The survey also found that among village doctors whose actual work required elderly health management capabilities, the four specific capabilities all met actual work needs at rates exceeding 88.00%. These findings indicate that while the overall qualifications of village doctors are not high, most are competent in providing health management services for the four key populations and basically possess health management service capabilities.

3.2 Female Village Doctors Have Advantages in Providing Women's Health Management Services

The survey found that female village doctors had higher possession rates than male doctors in specific capabilities including women's family planning guidance, prenatal health guidance, menopause-related disease prevention and treatment, and gynecological disease screening, as well as overall women's health management capability. Female doctors have gender advantages in providing women's health management services, as female patients are more willing to accept services from female doctors. With only about 30% of village doctors being female, insufficient female doctor allocation is one reason for the deficiency in women's health management capability. Therefore, regions should consider local gender distributions of village doctors and appropriately increase the recruitment and training of female doctors to meet local women's health management service demands [8-9].

3.3 Rural Doctors with Rural Practitioner Qualifications Show Relative Deficiency in Managing Certain Key Populations

Survey results show that village doctors with practicing (assistant) physician qualifications had higher rates of menopause-related disease prevention and treatment capability and overall women's health management capability than those with rural doctor qualifications. General practitioner-qualified doctors had higher rates of elderly functional decline prevention capability than rural doctor-qualified doctors. This may be because these health management capabilities require relatively high professional knowledge and skills compared to other requirements, resulting in poorer mastery among rural doctor-qualified village doctors. With over 50% of village doctors in China holding rural doctor qualifications, this situation is not conducive to rural residents accessing high-quality, lifecycle health management services. Therefore, regions should focus on improving village doctors' practice qualifications, establish and improve training and advanced study mechanisms, and standardize on-the-job training. Village doctors participating in various qualification improvement examinations should receive targeted education and training based on precise classification

[10-13]. Simultaneously, regions should increase the cultivation of general practice talents and guide them to rural primary health institutions through policy optimization to strengthen the village-level health workforce and effectively improve health service capacity for rural residents, enabling them to serve as health “gatekeepers” [14].

3.4 Western Region Village Doctors’ Elderly Health Management Ability Meeting Work Needs Is Relatively Poor

The results show that among village doctors whose actual work requires elderly physical examination guidance and common disease screening, health and self-care ability assessment, negative emotion identification and intervention, and functional decline prevention capabilities, western region doctors had the lowest rates of meeting actual work needs across all four specific capabilities. This may be because western regions are predominantly mountainous and plateau terrain. Although requirements for village doctor staffing numbers are the same across eastern, central, and western regions, western village doctors have greater geographical distances from residents, requiring more time to deliver medical and public health services. The workload does not match staffing numbers, leaving many village doctors with little time to participate in health management capability training, resulting in relatively poor ability to meet actual work needs. The fundamental reason remains insufficient village doctor staffing in western regions. Western regional governments should cooperate with local medical schools to recruit students from rural areas through targeted enrollment, training, and employment, while providing policy incentives for remote areas to attract village doctors through multiple measures [15].

3.5 Active Measures Should Be Taken to Improve Village Doctor Quality and Sustainable Development

Implementing community health management in rural areas, compared with conventional community education and traditional self-management models, is more conducive to improving rural residents’ disease prevention knowledge and health behavior formation rates, and helps control health risk factors. As the main providers of health management services for rural residents, village doctor team construction is particularly critical. However, survey results show that village doctors under 45 years old account for only about one-third, indicating insufficient workforce replenishment. Therefore, it is necessary to establish scientific and effective incentive mechanisms for village doctors to attract and retain talent, such as establishing salary mechanisms suited to village doctors’ work characteristics, improving scientific and reasonable evaluation systems, optimizing pathways for education and qualification improvement, constructing talent mobility mechanisms, improving social security coverage, and providing more training opportunities and appropriate content. These measures can effectively improve the overall quality of village doctors and promote team stability and sustainable development [16-17].

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