How to allocate public health manpower in township health centers in China scientifically and reasonably

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INTRODUCTION

The global health issue is not a shortage of capital or technology, but a shortage of health manpower. Health human resource (HHR), an important component of health resources, determines the quantity, quality and effectiveness of health service, thus greatly impacting on health service to the citizens. In China, providing free basic public health services for urban and rural residents is a specific function of the government to carry out a preventative health policy, and it is a long-term fundamental system arrangement in public health. The implementation of national basic public health service is essential for gradually promoting the equalization of basic public health services, and a key task of deepening medical and health system reform. It is beneficial in preventing and controlling the spread of infectious and chronic diseases, in improving the accessibility to public health service, in gradually reducing urban-rural gaps and in progressively equalizing basic public health service through intervention in health problems of urban and rural residents, which could reduce major health risk factors.

Over the decade, the public health service system has been enhanced to promote the equality of urban and rural residents in utilizing public health service by implementing basic and major public health service. Recently, the training of public health personnel in China has been in great progress, but the training of public health personnel especially from grassroots is still confronted with multiple challenges, one of which is unreasonable allocation of human resources. The investment of public health manpower currently lacks a definite plan and aim[1]. A feasible allocation scheme of public health manpower should be designed in combination with socio-economic development based on the health demands of residents[2].

CURRENT SITUATION IN ALLOCATION OF HUMAN RESOURCES IN TOWNSHIP HEALTH CENTERS

Township health centers are basic medical institutions that provide primary healthcare and rehabilitation services to rural communities, and realize the global strategy of “health for all”. Hence, it plays a pivotal role in rural healthcare network. However, there is an imbalance in the distribution of health human resources between urban and rural areas in China. Study on rural health human resources, especially the allocation of HHR in township health centers, is extremely important. HHR in township health centers means the total quantity and quality of staff in medical care and other activities[3]. According to the 2012 China Health Statistics Yearbook, the number of manpower in township health centers increased from 1.012 million to 1.166 million (from 1.16 per 1,000 rural persons to 1.32 per 1,000 rural persons) from 2005 to 2011. In 2011, the proportion of township health center staff aged below 25 years, 25-34 years, 35-44 years, 45-
54 years, 55–59 years and 60 years and above was 7.3%, 35.3%, 34.7%, 15.1%, 5.2% and 2.4%, respectively. The proportion of high school graduate or below, technical secondary school degree, college degree and bachelor degree was 7.5%, 51.8%, 34.8% and 5.9%, respectively. The academic titles were mainly primary or below. Since the working environment and salary in township health centers are not satisfactory, it is hard to retain the talents. There are many problems of HHR in township health centers in China\cite{16-7}, such as lack of manpower, low qualification and academic title, aging of personnel and unreasonable regional distribution. It has been forecasted\cite{8} that the total number of the township health center manpower should be 1.327 million to meet the needs, which corresponds to 1.54 per 1,000 people, and allocation of public health manpower requires 0.44 per 1,000 people in 2008. There is no standard for manning quotas and the allocation of HHR is a main problem in the development of township health centers\cite{9}. The allocation of personnel in township health centers currently is mainly based on beds, which may lead to unreasonable expansion of beds, thus resulting in waste of limited health resources. Being one of the core subjects in providing public health service in rural areas, township health centers need higher requirement for allocation of manpower. At present, the allocation of public health manpower is rarely being studied, and most of the work is based on service populations. There is lack of scientific basis on forecasting the number of public health manpower. Therefore, suitable allocation of public health personnel will help us to carry out public health service in rural areas, and to improve the accessibility and utilization rate.

FOUR MAIN APPROACHES FOR FORECASTING HEALTH MANPOWER IN TOWNSHIP HEALTH CENTERS IN CHINA

Forecasting health manpower demand is an important aspect of HHR planning. Many scholars, at home or abroad, have done many researches on allocation of HHR. However, the prediction and allocation of HHR are affected by many factors and some factors may not be controllable by policymakers and health professionals\cite{10}. Population status, financial condition, healthcare demand and the utilization ratio of health resources will have an impact on health manpower prediction. There is no ideal or universal allocation method. Four main forecasting approaches on health manpower recommended by the WHO are the demand-based approach, needs-based approach, population-based rates and service-target approach.

Health service demand means the quantity of healthcare services demanded by the population. It is constrained by cognition of disease, payment capacity, willingness to purchase and others. Demand refers to various types and levels of health services that the population in a given area will seek and has the means to purchase at the prevailing prices within a given period\cite{11}. Meanwhile, policymakers should take the potential demand into account in the planning stage. As it is difficult to predict potential demand, the allocation quantity is the minimum standard for health service demand. Zheng et al. forecasted the allocation scheme of public health manpower by using the demand-based approach\cite{12}, which has been adopted by Community Health Service Institutions, Center for Disease Control and Prevention, Sanitary Supervision Department and other agencies. The needs-based approach involves defining and projecting health care deficits along with appropriate health care services. This planning method combines healthcare need on the types, quantity and items with the health resources necessary. It is mostly used to plan and allocate the healthcare resources. Population-based rate is a simple method, and it is mostly used to forecast the need and supply of HHR. Service-target approach forecasts the quantity of health service in the targeted year based on the present allocation and utilization ratio of health resources. Population growth and potential healthcare demand would be considered.

In addition, forecasting models are also adopted in HHR prediction. Santric-Milicevic et al. identified variables that were significantly related to physician and nurse employment rates in the public healthcare sector in Serbia from 1961 to 2008 and used these to develop parameters to model physician and nurse supply in the public healthcare sector through 2015\cite{13}. The supply has been modeled by using Autoregressive Integrated Moving Average (ARIMA)/Transfer Function (TF) models. The most significant predictors for physician employment are population and GDP. The supply of nursing staff is related to the number of physicians in turn.

The above-mentioned methods have been performed by some scholars to forecast and plan the health human resources in township health centers in China. Zhang et al. forecasted health manpower in township health centers in Hebei Province by using the demand-based approach and service-target approach\cite{14}. They concluded that there were many problems in allocation of human resources in township health centers in Hebei, such as lack of manpower, lower qualification
and academic title. The demand-based approach was applied by Xu et al. to forecast HHR in township health centers in Liuyang City,[15] and they found that there was a balance between the supply and demand of HHR, but the distribution was unreasonable and the academic title of HHR in township health centers was low.

In conclusion, available studies are limited in forecasting total health human resources in township health centers. The number of physicians for township health centers is forecasted according to the outpatient and inpatient workload, and the number of non-physician health workers is predicted in accordance with the ratio of physicians to non-physician health workers. A need-based approach could be applied to allocate public health manpower, the key to which is the evaluation of the quantity of basic public health services provided by township health centers. A predictive model of public health manpower can also be established for service populations and service areas, which should be dynamically adjusted on a scientific and reasonable basis.

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