

The Development Trend of Primary Healthcare after Health Reform in China

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Research article

Keywords: primary healthcare, health reform, development

Posted Date: June 4th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-17837/v2>

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Abstract

Background: Re-constructing the primary healthcare system is the focus of the new round of Chinese health reform. Nevertheless, there have been few studies focusing on whether the role of primary healthcare in the health system is strengthened in China.

Methods: The data of this study came from the China Health Statistical Yearbook (2009–2018). We evaluated the development of primary healthcare based on the absolute values of health resources allocation and health service provision, and evaluated the status of primary healthcare throughout the health system based on the composition ratios of the indicators across the health system.

Results: From 2009 to 2018, the amounts of health resources allocation and health service provision of Chinese primary healthcare institutions showed a significant upward trend ($P < 0.001$). However, compared the indicators in 2009, excepting for the proportion of grants from the government in the whole health system has an upward trend, the proportions of other indicators had an escalating trend in 2018 by 4.04% for practicing (assistant) physicians, by 2.55% for nurses, by 4.06% for total revenues, by 5.54% for beds, by 7.37% for outpatient visits.

Conclusion: The primary healthcare system has developed rapidly, but its development speed lagged behind the entire health system, resulting in the weakening of its actual functions, which is not in line with the goal of health reform. The government should improve the awareness of the importance of primary healthcare at all levels of local governments and ensure adequate financial input.

Introduction

Primary healthcare is the key for achieving the goal of “health for all”.⁽¹⁾ Chinese government had established a relatively complete primary healthcare system in the late 1950s.⁽²⁾ Under the conditions of social and economic backwardness and health resource shortages at the time, this system played an important role in protecting the health of population.⁽³⁻⁶⁾ However, after 1978, when a market-oriented economy reform was implemented in Chinese health sector⁽⁷⁻¹⁰⁾, Chinese primitive health system had undergone tremendous changes, which mainly manifested was that the government funding in the health system has been extremely reduced^(5, 7, 11). Subsequently, the primary healthcare system, which mainly relied on government funding to maintain normal operation, collapsed almost overnight^(6, 12), and health costs increased rapidly in the next 30 years. There are some problems in primary healthcare institutions, including lacking of adequate health resources, sharp decline in health service provision and lack of trust for residents.⁽¹³⁻¹⁹⁾ Based on the reasons above, primary healthcare institutions have become the least developing and most vulnerable part of health system in China.

In response to the above problems, the government began to launch a new round of health reform in 2009.^(3, 20, 21) Re-constructing the primary healthcare system is the focus of this reform^(21, 22), and it is also the key to realizing the reform goal. The government stated that increasing the input in primary healthcare was one of the five top priorities of this plan. In the first three years from 2009, the government health investment amounted to approximate CNY 1409.9 billion (equivalent of \$ 206 billion), and 44% of those were allocated for primary healthcare institutions.⁽²³⁾ The 12th 5-Year Plan for Health, announced in 2012, reconfirmed the government’s commitment to the ongoing reform and set new targets for 2015, including continuous improvements in primary healthcare infrastructure and training of general practitioners⁽²⁴⁾.

Up to now, Chinese health reform has been launched for 10 years. In the context of this still developing healthcare system, efforts are needed to assess the development of Chinese primary healthcare system. Such assessments would provide indications of the health reforms domains that are performing successfully, as well as the domains that require further attention and improvement. At present, studies mainly summarized the history and development of Chinese primary healthcare^(2, 3, 25), and evaluated the fairness of resource allocation and utilization of primary healthcare service.⁽²⁶⁻³⁰⁾ However, due to the lack of support for the projects from the government, the lack of attention from researchers and other reasons, there have been few studies focusing on whether the role of primary healthcare in the overall health system is strengthened, which is the core goal of this round of health reform in China.

Health resources allocation and health service provision are the two core contents of health service research. Primary healthcare is an important part of the whole health system, analyzing it’s the constituent ratio of health resources allocation and health service provision in the whole health system which is the main way to analyze its role in the whole health system. Based on the Chinese health statistics data in the past 10 years, this study evaluated the development of primary healthcare system via analyzing the changing trend of health resources and health service quantities, and evaluated the role of primary healthcare in the whole health system by analyzing the proportion of health resources allocation and health service provision in the whole health system. This study could provide a reference for the continuous improvement of Chinese health reform policies and measures which could promote the realization of the goal of reconstructing the primary healthcare system.

Methods

Study design and data source

This study was a longitudinal observational study based on the China Health Statistics Yearbook (2009-2018), which provided information on health resources and health services of different kinds of medical institutions in China. In order to assess whether Chinese health resources were tilted toward primary healthcare institutions and whether the service quantity of primary healthcare services has been increased, we analyzed the dynamic changes in the absolute value and the constituent ratio of health resource allocation and health service provision in primary healthcare institutions from 2009 to 2018.

Indicators and definitions

In this study, the definition of primary healthcare institutions refers to the statistical caliber of the China Health Statistics Yearbook. In China, primary healthcare institutions include community health service centers (stations), township health centers, village clinics, outpatient departments, clinics, infirmaries and nursing stations. The main indicators of this study are health resource allocation and health service provision. Health resources include human resources, financial resources and material resources. Human resources include the number of health workers, practicing (assistant) physicians, nurses, and pharmacists. Financial resources include total revenues, grants from the government and business incomes. Material resources include total number of equipment at or above CNY 10,000, building areas, and the total number of beds. Health service provision includes annual number of outpatient visits and inpatient care.

Statistical Analysis

In this study, analyses were performed using SAS version 9.2 (SAS Inc., Cary, NC, USA). We used the absolute value of each indicator to analyze the development of primary healthcare institutions and the linear regression analysis to test the trend of absolute values over time. When the regression coefficient β was positive, the absolute value of each indicator had an upward trend, on the contrary, when β was negative, the absolute value of each indicator showed a downward trend. We evaluated the status of primary healthcare throughout the health system based on the composition ratio of the indicators across the health system, and used the Cochran-Armitage trend test to examine the trend of composition ratio for each indicator over time. The Z value was positive which means that the composition ratio of each indicator has showed an upward trend, oppositely, the Z value was negative which means that the composition ratio of each indicator presented a downward trend. All statistical tests were two-tailed, and a P value <0.05 were considered to be statistically significant.

Results

Basic information on health resources allocation and health service provision of Chinese medical institutions

From 2009 to 2018, the quantities of human resources, financial resources and physical resources of Chinese medical institutions showed a significant dynamic upward trend over time, which were statistically significant ($P<0.001$). Compared with the human resources in 2009, the quantities of the total health workers, practicing (assistant) physicians, nurses, and pharmacists in 2018 have increased by 58.07%, 54.87%, 120.97% and 36.79%, respectively. Compared with the financial resources 2009, Chinese medical institutions' total revenues, grants from the government and business incomes in 2018 have increased by 246.56%, 354.18% and 223.39%, respectively. Compared with the values in 2009, the total number of equipment at or above CNY 10,000 has increased by 189.30%, building areas has increased by 81.76%, and the number of beds has increased by 90.28% in 2018. The quantities of outpatient visits for Chinese medical institutions significantly increased by 53.80% from 2009 to 2018, and the quantities of inpatient care for Chinese medical institutions significantly increased by 92.01% from 2009 to 2018. (Table 1)

Table 1 Health Resources Allocation and Health Service Provision of Medical Institutions in China, 2009-2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	% ^a	β
i	7,781,448	8,207,502	8,616,040	9,115,705	9,790,483	10,234,213	10,693,881	11,172,945	11,748,972	12,300,325	58.07	50559
(2,329,206	2,413,259	2,466,094	2,616,064	2,794,754	2,892,518	3,039,135	3,191,005	3,390,034	3,607,156	54.87	14139
/	1,854,818	2,048,071	2,244,020	2,496,599	2,783,121	3,004,144	3,241,469	3,507,166	3,804,021	4,098,630	120.97	25004
s	341,910	353,916	363,993	377,398	395,578	409,595	423,294	439,246	452,968	467,685	36.79	14262
i	1,186,291.18	1,372,627.83	1,647,299.36	1,998,578.88	2,314,754.80	2,643,488.53	2,953,787.71	3,316,611.68	3,697,532.03	4,111,172.38	246.56	32811
/	133,533.79	166,787.42	228,599.98	271,403.45	313,104.35	350,062.81	432,130.74	484,856.63	543,225.10	606485.23	354.18	52679
n	1,034,124.24	1,184,722.31	1,392,683.83	1,653,952.71	1,914,745.48	2,197,213.63	2,414,403.39	2,709,985.97	3,015,316.40	3,344,278.71	223.39	25912
n	2,528,796	2,824,445	3,176,357	3,586,935	4,172,171	4,833,818	5,290,731	5,924,738	6,578,025	7315901	189.30	53863
:	463.34	500.98	582.48	553.87	584.75	614.42	652.56	682.26	728.55	842.17	81.76	36.32
t	4,416,612	4,786,831	5,159,889	5,724,775	6,181,891	6,601,214	7,015,214	7,410,453	7,940,252	8404078	90.28	44548
:	5,187.41	5,521.32	5,944.81	6,529.94	6,960.52	7,258.64	7,366.24	7,600.34	7,847.83	7978.16	53.80	318.10
:	132.56	141.74	152.98	178.57	192.15	204.41	210.54	227.28	244.36	254.54	92.01	13.91

^a “%” were the value’s growth rates in 2018 compared with the value in 2009; ^bP values were associated with linear regression analysis.

Basic information on health resources allocation and health service provision of Chinese primary healthcare institutions

Table 2 suggested that in addition to the number of inpatient care, the indicators of health resources and service provision had an apparent upward trend ($P<0.001$). In comparison with the indicators in 2009, the amounts of health resources had an escalating trend in 2018 by 25.78% for the total health workers, by 40.63% for practicing (assistant) physicians, by 101.86% for nurses and by 23.21% for pharmacists. The amounts of total revenues, grants from the government and business incomes had increased by 173.26%, 628.51% and 93.70% from 2009 to 2018, respectively. As to material resources, the growth rates of total number of equipment at or above CNY 10,000, building areas and the total number of beds were 140.30%, 37.85% and 45.11%, respectively. Furthermore, the outpatient visits in Chinese primary healthcare institutions increased from 3,145.14 million people in 2009 to 4,167.90 million people in 2018, which the growth rate was 32.52%.

Table 2 Health Resources Allocation and Health Service Provision of Primary Healthcare Institutions in China, 2009-2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	% ^a	β	P ^b
i	3,152,040	3,282,091	3,374,993	3,437,172	3,514,193	3,536,753	3,603,162	3,682,561	3,826,234	3,964,744	25.78	79889	<0.001
(928,026	949,054	959,965	1,009,567	1,050,067	1,064,136	1,101,934	1,145,408	1,213,607	1,305,108	40.63	39176	<0.001
/	422,262	466,503	492,554	528,178	576,630	603,900	646,607	695,781	769,206	852,377	101.86	44780	<0.001
s	119,166	125,467	125,698	127,262	130,039	131,493	134,495	138,060	142,482	146,827	23.21	2745.56	<0.001
i	224,128.23	225,727.98	263,839.57	313,849.49	353,254.73	382,963.06	434,885.37	482,937.52	548,396.95	612,463.66	173.26	43891	<0.001
/													
n	27,142.39	40,547.58	67,934.89	90,153.68	104,919.08	113,195.10	139,736.03	157,679.73	178,440.41	197,735.18	628.51	18826	<0.001
n													
it	189,990.72	177,344.00	185,422.60	197,907.09	220,406.55	240,606.31	262,031.70	288,862.13	328,332.33	368,005.51	93.70	20538	<0.001
n													
i	354,402	405,494	435,463	439,640	482,336	532,575	579,740	640,344	719,543	792,199	140.30	49674	<0.001
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0	165.75	187.05	188.97	184.43	188.57	194.18	200.38	205.55	213.04	228.49	37.85	5.35	<0.001
t	1,091,277	1,192,242	1,233,721	1,324,270	1,349,908	1,381,197	1,413,842	1,441,940	1,528,528	1,583,577	45.11	49523	<0.001
:	3,145.14	3,350.67	3,535.62	3,819.96	4,044.53	4,101.92	4,092.13	4,118.70	4,179.73	4,167.90	32.52	113.92	<0.001
:													
:	41.11	39.50	37.75	42.54	43.01	40.94	40.37	41.65	44.50	43.76	6.44	0.423	=0.051

^a “%” were the value’s growth rates in 2018 compared with the value in 2009; ^bP values were associated with linear regression analysis.

Proportions of health resources allocation and service provision by primary healthcare institutions

Figure 1a showed the trend of human resource allocation in Chinese primary healthcare institutions over time from 2009 to 2018. The results indicated that the proportion of health workers had decreased year by year, which was statistically significant ($P < 0.001$). The proportion of the number of health workers declined from 40.51% in 2009 to 32.23% in 2018. Among them, practicing (assistant) physicians declined from 39.84% in 2009 to 36.18% in 2018, nurses declined from 22.77% in 2009 to 20.80% in 2018, and pharmacists declined from 34.85% in 2009 to 31.39% in 2018.

In the allocation of financial resources, the proportion of grants from the government has an increase of about 10 percentage points, increasing from 22.33% in 2009 to 32.60% in 2018. On the contrary, the proportions of total revenues and business incomes had a significant down, which were a decrease of 3.99% and 7.37% in these two departments, respectively, compared with proportions in 2009 (Figure 1b).

As to 2018, among material resources, the proportions of total number of equipment at or above CNY 10,000, building areas and the total number of beds had decreased by nearly 2, 8, and 6 percentage points, respectively. (Figure 1c)

The dynamic change of the proportion of service provision in primary healthcare institutions from 2009 to 2018 was showed in Figure 1d. The number of outpatient visits in primary healthcare institutions dropped from 60.63% in 2009 to 52.24% in 2018, a decrease of approximate 8 percentage points. The

proportion of inpatient care decreased from 31.01% in 2009 to 17.19% in 2018, a decline of approximate 13 percentage points. All ($P < 0.001$) showed a significant downward trend.

(The results of all the indicators' trend tests were shown in Supplementary File 1. To access Supplementary File 1, click on the Supplementary File 1 link in the box to the right of the article online.)

Discussion

Based on continuous longitudinal data from 2009 to 2018, this study analyzed the development of primary healthcare in China from two interrelated aspects: health resource allocation and health service provision. The present study found that Chinese primary healthcare system has made some progress after the health reform during the past 10 years, but its development rate was slow, lagging behind the whole health system, which indicated that the role of primary healthcare has been indeed weakened in China.

With the prosperity of Chinese economy, the government funding in the health system has steadily increased, and the total health expenditure has increased from CNY 1,720.5 billion (US\$ 252.0 billion) in 2009 to CNY 5,912.2 billion (US\$ 835.8 billion) in 2018^(31,32). At the same time, the government was actively building an integrated health system and encouraging social capital to establish private medical institutions.⁽³³⁾ In addition, with the improvement of residents' living standards, the health service system need to meet higher healthcare requirements, such as the release of health demand, high quality of health services.⁽³⁴⁾ These factors have contributed to the rapid development of the Chinese health system over the past decade.

As an important part of the health system, the primary healthcare has been paid more attention by the Chinese government in terms of funding and policies.^(23,31,35-40) Unfortunately, the results of this study showed that the development of Chinese primary healthcare might have lagged behind the whole health system in the past decade, which had not yet reached the goal of health reform to strengthen the role of primary healthcare. The reasons for this result may be multifaceted. Firstly, in spite of the Chinese central government had formulated a series of policies and measures to promote the development of primary healthcare, the implementation of the policies were mainly done by local governments.⁽⁴¹⁾ The implementation of policies was inevitably accompanied by the allocation of health resources. Due to lacking awareness of the importance of primary healthcare among local governments⁽⁴²⁻⁴⁶⁾, they might have allocated more resources to general hospitals and specialist hospitals. Secondly, current power structure inside the medical industries is more likely to elicit a trend that the general hospitals possess more the power of discourse than the primary healthcare institutions in same region. Thirdly, previous studies have consistently concluded that the development of primary healthcare lacked sufficient financial support in China^(16,17), but how much financial investment is sufficient has been lack of research. Fourthly, compared with hospitals, primary healthcare institutions had lower remuneration and limited career development prospects in China, which led to extremely low attraction for excellent health professionals⁽⁴⁰⁾. In this study, the proportion of health workers in primary healthcare institutions has decreased year by year, from 40.51% in 2009 to 32.23% in 2018. Furthermore, for a long time, residents had no confidence in primary healthcare and blindly chose high-level hospitals.^(13-15,18,19) In the past decade, the lag in the development of primary healthcare has further intensified patients to choose hospitals for medical services, resulting in reducing the business incomes of primary healthcare institutions and aggravating the shortage of health funds, then forming a vicious circle of "the development backwardness of primary healthcare-low attractiveness for patients-more backward of primary healthcare".

On the occasion of the 10th anniversary of Chinese health reform, there have been many studies expounding the effectiveness of health reform. Our study revealed an easily ignored problem in Chinese health reform process. Considering the importance of primary healthcare, the problem should be taken seriously. This study also had some limitations. Due to the limited data provided by the China Health Statistics Yearbook, we could only analyze the development of primary healthcare based on health resource allocation and health service provision. Other important evaluation dimensions, such as the health service quality and the development equity of primary healthcare, were not analyzed, which could limit the overall understanding of primary healthcare development in China. In addition, the data we used came from the China Health Statistical Yearbook, which was panel data, so that we could only carry out descriptive and trend analysis and was difficult to make a more in-depth analysis and comparison. It was also impossible for us to analyze that how much of the changing trend in the development of primary healthcare could be attributed to the health reform.

Conclusions

After the implementation of the latest round of health reform in China, the primary healthcare system developed rapidly, but its development speed lagged behind the whole health system, resulting in the weakening of its actual functions, which is not in line with the goal of health reform. In the next stage of the health reform, the Chinese government should improve the awareness of the importance of primary healthcare at all levels of local governments, mobilize their enthusiasm, ensure adequate financial input, and improve the occupational attractiveness of primary healthcare. Additionally, health education and reasonable payment methods of medical insurance should be introduced to change residents' health seeking patterns and guide residents to use primary healthcare services.

Declarations

Ethics approval and consent to participate: No ethical approval and consent to participate were required for this study.

Consent for publication: Not-applicable.

Availability of data and materials: The data that support the findings of this study are available from the corresponding author, Pro. Xiaoxv Yin. Email: yxx@hust.edu.cn

Competing interests: None.

Funding: The study was supported by the key program of the National Social Science Foundation of China (Program No. 18ZDA085).

Authors' contributions: J. Feng conceived the study and analyzed the data. Data collection was performed by J.X. Wu. J. Feng and Y.H. Gong wrote the draft of the paper. J. Zhang checked the draft of the paper. H. Li gave advice on statistical methodology. X.X. Yin and Z.X. Lu provided advices and supervision of the work. G.P. Zhang and X.X. Yin brought up connected suggestions for revise the manuscript and checked the revised manuscript. All authors read and approved the final manuscript.

Acknowledgements: We would like to thank the study participants, reviewers and editors.

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Figures

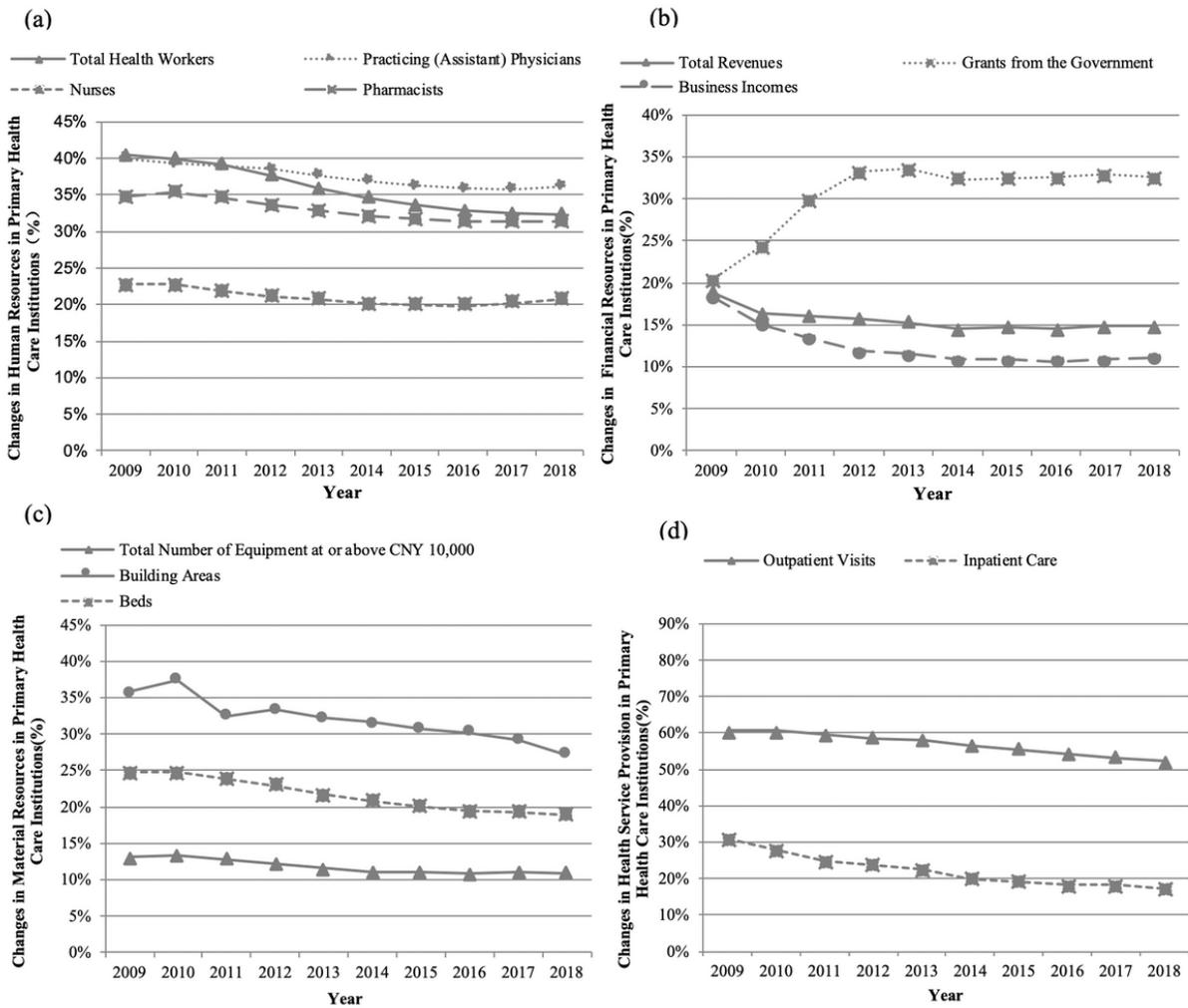


Figure 1
 Changes in percentage of health resources allocation and health service provision of primary healthcare institutions. (a) Changes in percentage of human resources in primary healthcare institutions, 2009-2018. (b) Changes in percentage of financial resources in primary healthcare institutions, 2009-2018. (c) Changes in percentage of material resources in primary healthcare institutions, 2009-2018. (d) Changes in percentage of health service provision in primary healthcare institutions, 2009-2018.

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