

Workload and job satisfaction of rural doctors during the new healthcare reform in China: a cross-sectional mixed methods study

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Abstract

Background

With the integration of urban and rural health insurance, the demand for health services from rural residents increases rapidly, which in turn, bring heavier workload for doctors from county public hospitals (CPHs). Meanwhile, township healthcare centers (THCs) are required to provide more additional public health services under the integration of public health and primary care, which also brings challenges for its doctors' workload. As a result, Chinese rural doctors from both CPHs and THCs have to cope with heavier workload that may have an adverse effect on their job satisfaction. This study sought to investigate the association between the workload and their job satisfaction during the new healthcare reform in China.

Methods

A cross-sectional survey using mixed methods targeting Chinese rural doctors from both CPHs and THCs in three provinces of Gansu (the west province of China), Shanxi (the middle province of China), and Shandong (the east province of China) was conducted. Correlation analyses of three dimensions of workload and job satisfaction were performed. The association between workload and job satisfaction was estimated using discrete choice regression and the detail parts of workload were analyzed using qualitative data collected from interviews with some agency administrators and representatives from the respondents.

Results

Of the 849 rural doctors enrolled, 52.18% thought that the proportion of time spent on non-medical activities (PT) was too high; 78% reported that they worked more than 8 hours in a working day; up to 40% of rural doctors from county public hospitals (CPHs) reported unaffordable clinical visit number per day (CV), which was significantly higher than that from township healthcare centers (THCs). Both of the proportion of time on non-medical issues and working hours (WH) were significantly and negatively associated with the job satisfaction of rural doctors. However, the effects of clinical visit number were mixed, with a significantly negative association with the job satisfaction of doctors from CPHs rather than from THCs. Qualitative analysis indicated that non-medical activities constituted the main source of Chinese rural doctors workload, in terms of a performance assessment criteria for doctors from CPHs and public health services for doctors from THCs.

Conclusion

The workload, dominated by non-medical activities, working hour and clinical visit number, are non-negligible factors that negatively associated with Chinese rural doctors' job satisfaction in the healthcare reform setting. The growing number of patients towards CPHs and the additional public health service imposed on the THC doctors were the main source for the workload that worsened rural doctors' job satisfaction. Policy makers should consider some feasible measures to reduce non-medical activities for rural doctors so that they could dedicated their limited energy and time to the medical service.

Introduction

In recent decades, a large number of countries have been exploring healthcare reform to seek for a reasonable trade-off between fairness and efficiency^(1, 2). China is not an exception. In the new round of medical reforms which began in 2009, the Chinese government puts forward the goal as "maintaining the basics, strengthening the grassroots, and building mechanisms". With the purpose of equalizing public services domestically, the "new rural cooperative healthcare system", one of the most important elements of new healthcare reform, has been proved to effectively activated the demand for medical services of rural residents in China. Recently, with the aim of universal health coverage, new healthcare reform requires to increase the rural residents' visit rate in their own county and a large proportion of the patients from rural areas urge to county public hospitals (CPHs) which is on the top of the three-tier rural health system. As a result, the workload for doctors from CPHs is heavier than ever accordingly.

Meanwhile, in the orientation of returning to public welfare for primary healthcare organization in Chinese healthcare reform setting, township healthcare centers (THCs) were required to provide more additional public health services. Because of the shortage of public health workers in THCs, quite a few doctors in the institution have to undertake the additional public health services⁽³⁾. Doctors often put more values on medical services rather than public health services⁽³⁾. Only when employees consider their work meaningful can they recover quickly from work fatigues⁽⁴⁾. Therefore, under this setting, non-medical activities contribute to THC doctors' workload as well.

Previous studies on job satisfaction have found that one of the factors affecting job satisfaction is whether self-worth is realized^(5, 6). When health workers feel the recognition of their work and see the improvement of patients' health, they will have a feeling of self-realization, which will improve their job satisfaction. Heavy workload can lead to high work pressure for doctors, increase the risk of health problem, and therefore negatively influence their job satisfaction⁽⁷⁻¹⁰⁾. Long-term burdens even increase the chance of medical accidents⁽¹¹⁻¹⁴⁾. Chinese new healthcare reform brings overburden to doctors including both doctors from CPHs and THCs (hereafter, rural doctor). However, less research is targeted on rural doctors' workload and compare what constitute in their workload in CPH doctors and THC doctors differently.

As a stakeholder and essential part of health systems, doctors are central to the achievement of new healthcare reform goal^(15, 16). Health services are highly heterogeneous and personalized⁽¹⁷⁾, which need doctors put both their professional knowledge and service attitude. Therefore, they are engaged in work

with both mental and emotional labors. Their incentive plays an important role in the delivery of medical services⁽¹⁸⁾ and their job satisfaction has a positive relationship with the quality of health services and efficiency^(19–22) and has a negative relationship with their turnover intention^(23–25). In the context of continuous development and changes of health industry, healthcare professionals face many stresses, and their job satisfaction has attracted increasing attention^(26–28). Specifying what constitutes the main part of the workload of rural doctors and its distribution in CPHs and THCs and discussing the relationship between workload and job satisfaction would be beneficial to attract and retain rural doctors and improve the sustainability of health services in the background of new healthcare reform in China. At the same time, it also provides empirical evidence for the reform of medical and health system in other countries.

Therefore, this study aimed to portray the workload of rural doctors during the new healthcare reform in China and evaluate the relationship between workload and job satisfaction of doctors, focusing on the differences between CPHs and THCs in rural areas, by utilizing the data from a cross-sectional survey, including focus group interviews with doctors and hospital managers.

Methods

Design and procedure

Both quantitative and qualitative analyses were adopted to evaluate the workload of rural doctors and their association with job satisfaction. The data of a cross-sectional study was collected from doctors from county public hospitals (CPHs) and township healthcare centers (THCs) in Gansu, Shanxi, and Shandong provinces during June–July 2019. County public hospitals include both county people hospital and Chinese traditional medicine hospital. The three provinces were selected, because they are located in the west, middle, and east of China, respectively. Two pilot tests within a small group of Tashang Township Healthcare Center which lies in Lingshou County, Hebei Province, had been conducted to assess the validity of the questionnaire. All respondents were voluntary and anonymous. Thirty-minute focus group interviews with hospital managers and some of the doctors were conducted to acquire additional information of the workload of doctors and other aspects related to their job satisfaction.

Measurements

Demographic and economic variables, such as gender, age, marital status, education level, professional title, and years of work experiences were collected in this study. Moreover, the relationship between workload and job satisfaction was evaluated.

Workload Workload is often measured by work intensity and working hours⁽¹²⁾. As stated above, non-medical activities also contributes to doctors' workload. This study examined the three different but Inter-related indicators. (i) Clinical visit number (CV) that reflects the number of patients a doctor sees one day on average is directly related to the intensity of doctors' work. Given the potential differences between different departments in the amount of medical services and the number of patients seen, self-

assessment of the number of patients was used as a measurement of workload. CV was assessed by their answers of “moderate”, or “too many” to a question as “What do you think is the average number of patients you see each day?”. (ii) Working hours one day on average (WH). As a more objective measurement of workload, the WH of respondents were evaluated by their answers of working “less than 8 hours”, “8–10 hours”, “10–12 hours”, or “more than 12 hours” per day. (iii) The proportion of time spent on non-medical activities one day on average (PT). A question as “what do you think of the proportion of non-medical activities in a routine working day” with answers of “moderate”, or “too much” was used to assess the PT of the respondents. Non-medical activities mainly point to activities that is irrelevant to doctors’ clinical job and include sorting administrative matters, attending meetings, and dealing with the inspections of supervising authorities. In addition, for respondents in THCs, non-medical activities also include public health services providing.

Job satisfaction Job satisfaction is an important indicator of employee’s occupational well-beings ⁽²⁹⁾. Respondents were asked a question as “On the whole, are you satisfied with your job?” to measure their job satisfaction. Likert 5-point method was adopted to assess the corresponding answers as “very dissatisfied” (1 point) to “very satisfied” (5 points), of which “Very dissatisfied/ dissatisfied”, “reasonable”, and “Satisfied/very satisfied” were converted to 1–3 points, respectively.

Statistical analysis

The statistical package STATA 15.0 was used for data analysis. Socio-demographic data was analyzed, focusing on its subgroup of CPHs and THCs. Joint distribution analyses of workload and job satisfaction were carried out through Pearson's chi-squared test. Three ordered probit regression models were performed to investigate the association between job satisfaction and three dimensions of workload: CV, WH and PT (see Table 3). In model 1, model 2 and model 3, job satisfaction was regressed on CV, WH and PT respectively. In model 4 the three dimensions of workload were added in the regressors.

Furthermore, open-ended questions and focus group interview were presented as a narrative summary.

Results

Characteristics of respondents

A total of 1,043 rural doctors participated in the study. Finally, 849 questionnaires were included for cross-sectional data analysis and 194 questionnaires were excluded because of too much missing data, leading to a response rate as 81.3%. Table 1 presents characteristics of the respondents. Among the 849 respondents, 65.49% were from township healthcare centers (THCs). 58.07% were female, and more than a half (51.83%) were at least 35 years old. The average age of THC respondents was older than that of County public hospitals (CPHs) respondents ($p < 0.001$).

Workload was indicated by three dimensions. 20.73% of rural doctors thought number of patients seen per day was too many, and there was significant difference between CPH doctors (40.61%) and THC

doctors (10.25%, with $p < 0.001$). 52% of rural doctors reported their working hours per day was distributed in the range of 8 to 10 hours. The proportion of CPH doctors who reported work more than 8 hours was higher than that of THC doctors ($p < 0.001$), though the latter had a more fat tailed distribution. The proportion of time spent on non-medical activities was high in rural doctors (52.18%), with 49.83% in CPH doctors and 53.42% in THC doctors but with no significant difference. 40.16% of rural doctors reported they were satisfied with their job. The satisfaction rate was slightly higher in CPH doctors (40.61%) than in THC doctors (39.93%).

Table.1 Characteristics of participants

	Overall (n = 849) n (%)	CPHs (n = 293) n (%)	THCs (n = 556) n (%)	P value
Gender				< 0.05
Male	356 (41.93)	137 (46.76)	219 (39.39)	
Female	493 (58.07)	156 (53.24)	337 (60.61)	
Age (in years)				< 0.001
<25	75 (8.83)	30 (10.24)	45 (8.09)	
25–34	334 (39.34)	145 (49.49)	189 (33.99)	
35–44	294 (34.63)	81 (27.65)	213 (38.31)	
45–54	132 (15.55)	36 (12.29)	96 (17.27)	
≥ 55	14 (1.65)	1 (0.34)	13 (2.34)	
Marriage				0.001
Married	720 (84.81)	232 (79.18)	488 (87.77)	
other	129 (15.19)	61 (20.82)	68 (12.23)	
Educational level				
High school and below	87 (10.25)	9 (3.07)	78 (14.03)	< 0.001
Associate degree	335 (39.46)	63 (21.50)	272 (48.92)	
Bachelor's degree and above	427 (50.29)	221 (75.43)	206 (37.05)	
Professional Title				< 0.001
No professional title	180 (21.2)	38 (12.97)	142 (25.54)	
Primary title	417 (49.12)	121 (41.30)	296 (53.24)	
Junior title	209 (24.62)	104 (35.49)	105 (18.88)	
Vice-senior and above	43 (5.06)	30 (10.24)	13 (2.34)	
Work experience(in years)				< 0.001
≤ 5	226 (26.62)	107 (36.52)	119 (21.4)	
6–10	206 (24.26)	84 (28.67)	122 (21.94)	

	Overall (n = 849) n (%)	CPHs (n = 293) n (%)	THCs (n = 556) n (%)	P value
11–20	237 (27.92)	68 (23.21)	169 (30.40)	
≥ 20	180 (21.20)	34 (11.60)	146 (26.26)	
Staffing				< 0.001
Non-budgeted post	604 (71.14)	187 (63.82)	417 (75.00)	
Budgeted post	245 (28.86)	106 (36.18)	139 (25.00)	
Monthly salary (in RMBs)				< 0.001
≤ 2000	86 (10.13)	13 (4.44)	73 (13.13)	
2001–4000	464 (54.65)	107 (36.52)	357 (64.21)	
4001–6000	229 (26.97)	118 (40.27)	111 (19.96)	
> 6000	70 (8.24)	55 (18.77)	15 (2.70)	
Workload				
Clinical visit number				< 0.001
Moderate	473 (79.37)	184 (59.39)	499 (89.75)	
Too many	176 (20.73)	119 (40.61)	57 (10.25)	
Working hours per day (in hours)				< 0.001
≤8	187 (22.03)	39 (13.31)	148 (26.62)	
8–10	449 (52.89)	166 (56.66)	283 (50.90)	
10–12	123 (14.49)	69 (23.55)	54 (9.71)	
> 12	90 (10.60)	19 (6.48)	71 (12.77)	
Proportion of time spent on non-medical activities				0.113
Moderate	406 (47.82)	147 (50.17)	259 (46.58)	
Too high	443 (52.18)	146 (49.83)	297 (53.42)	
Job satisfaction				0.455
Dissatisfied	97 (11.43)	28 (9.56)	69 (12.41)	

	Overall (n = 849) n (%)	CPHs (n = 293) n (%)	THCs (n = 556) n (%)	P value
Moderate	411 (48.41)	146 (49.83)	265 (47.66)	
Satisfied	341 (40.16)	119 (40.61)	222 (39.93)	

Bivariate analysis: workload and job satisfaction

Pearson correlation analysis is used to explore the correlation between job satisfaction and workload of rural doctors, see Table 2. Result illuminate negative correlations between Chinese rural doctors' job satisfaction and their workload and among which the proportion of time spent on non-medical activities had the biggest correlation coefficient of -0.1979 ($P < 0.001$). As a further investigation, the relation between clinical visit number and job satisfaction (with the coefficient of -0.2253, $P < 0.001$) was greater than those of the other two dimensions of workload for CPH doctors, while the proportion of time spent on non-medical activities had the strongest negative association with THC doctors' job satisfaction (with the coefficient of -0.2180, $P < 0.001$). Working hours was negatively associated with the job satisfaction of CPH doctors ($p < 0.01$), but not that of THC doctors ($p > 0.05$, Table 2).

Table 2
Bivariate analysis of workload and job satisfaction

workload	overall		CPH doctors		THC doctors	
	Job satisfaction	p-value	Job satisfaction	p-value	Job satisfaction	p-value
Clinical visit number	-0.1240***	0.0003	-0.2253***	0.0001	-0.0935**	0.0274
Proportion of time spent on non-medical activities	-0.1979***	0.0000	-0.1548***	0.0080	-0.2180***	0.0000
Working hours	-0.1009***	0.0032	-0.0166	0.7775	-0.1403***	0.0009

* $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$

Multivariate analysis

Multivariate analysis of Ordered Probit regression was further conducted to analyze the association between workload and job satisfaction of rural doctors in total sample and two subgroups (CPH doctors and THC doctors) (see Table 3). The results show that doctors who receive larger clinical visit number, working more than 12 hours per day or have more proportion of time spent on non-medical activities are less satisfied with their job, controlling for the effects of other demographic variables (Model 1, Model 2 and Model 3 in Panal A). Putting the three dimensions of workload together, the estimated result did not change (Model 4). As for CPH respondents in Panal B, except working hours per day, both clinical visit number and proportion of time spent on non-medical activities had significantly negative association

with job satisfaction. Compared to CHP doctors, clinical visit number had less or even no significant effect on THC doctors' job satisfaction while proportion of time spent on non-medical activities had more significant effect on job satisfaction (Panal B Model 4 VS. Panal C Model 4).

Table 3
Multivariate regression models on workload and job satisfaction

	Model 1	Model 2	Model 3	Model 4
Panel A: overall				
Clinical visit number (reference, moderate)				
Too many	-0.375***			-0.301***
	(0.0994)			(0.102)
Working hours (reference, ≤ 8)				
8–10		-0.116		-0.0691
		(0.101)		(0.102)
10–12		-0.185		-0.0405
		(0.136)		(0.139)
≥12		-0.463***		-0.297**
		(0.147)		(0.150)
Proportion of time spent on non-medical activities (reference, moderate)				
Too high			-0.509***	-0.466***
			(0.0810)	(0.0824)
Panel B: CPH doctors				
Clinical visit number (reference, moderate)				
Too many	-0.479***			-0.426***
	(0.139)			(0.143)
Working hours (reference, ≤ 8)				
8–10		0.00106		0.0379
		(0.209)		(0.211)
10–12		-0.102		0.0623
		(0.238)		(0.245)

Control variables including age, gender, marriage status, educational level, wage (monthly salary), employment status was not reported in the table. Standard errors in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1

	Model 1	Model 2	Model 3	Model 4
≥12		-0.218		-0.0303
		(0.325)		(0.331)
Proportion of time spent on non-medical activities (reference, moderate)				
Too high			-0.372***	-0.306**
			(0.137)	(0.143)
Panel C: THC doctors				
Clinical visit number (reference, moderate)				
Too many	-0.384**			-0.242
	(0.159)			(0.163)
Working hours (reference, ≤ 8)				
8–10		-0.158		-0.113
		(0.118)		(0.119)
10–12		-0.236		-0.146
		(0.184)		(0.186)
≥12		-0.540***		-0.381**
		(0.166)		(0.170)
Proportion of time spent on non-medical activities (reference, moderate)				
Too high			-0.582***	-0.535***
			(0.102)	(0.103)
Control variables including age, gender, marriage status, educational level, wage (monthly salary), employment status was not reported in the table. Standard errors in parentheses.				
*** p < 0.01, ** p < 0.05, * p < 0.1				

Discussion

Although Chinese governments have increased their expenditures on domestic rural healthcare system and allocated more resources and try to recruit and retain more human resources for health to the system, there is still a large gap between supply and demand for health services in rural areas in the context of the new healthcare reform. In this cross-sectional empirical study, workload of rural doctors were found to

be heavy and associated with low degree of job satisfaction. Furthermore, there was some notable difference of workload between CPH doctors and their counterparts from THC.

Working hours and job satisfaction

The empirical results show that longer working hours lead to a lower degree of job satisfaction. In previous studies, there is a similar conclusion, that is, working too long will reduce job satisfaction^(30, 31). The operating hours of hospitals are 24 hours a day because of the unique nature of health services. Many health professionals need to take turns on night shifts. Longer working hours may cause burnout syndrome and harm psychological well-being⁽³⁾. In the context of emphasizing the function of public welfare of rural health system, there is still an egalitarian mentality in the compensation system. Longer working hours of doctors cannot therefore be reasonably compensated. Furthermore, long working hours inevitably lead to less time with family, which lead to “Work-Family” conflicts. This in turn can lower the job satisfaction of doctors. For professional employees (including doctors), “Work-Family” conflict has a more significant negative impact on their job incentives⁽³²⁾. Hausler (2018) pointed out that “Work-Family” conflict has a greater impact on doctors' job burnout than “Effort-Reward” imbalance⁽³³⁾. Compared with western countries, China has a stronger family concept^(34, 35); Compared with cities, the concept of rural families is stronger⁽³⁵⁾. Previous study indicated that “Work-Family” conflict has a greater impact on reducing job satisfaction among employees with strong tendency of family collectivism⁽³⁶⁾.

Proportion of time spent on non-medical activities and job satisfaction

Proportion of time spent on non-medical activities is another factor influencing job satisfaction. Research has found out that highly skilled professionals tend to show little interest in work irrelevant to their profession⁽⁴⁾. Healthcare sector is a knowledge intensive industry. Engaging in non-medical activities such as managing administrative affairs, attending meetings and preparing for inspections not only prolongs working hours, but also cause a decrease in work enthusiasm. Previous study shows that doctors in public hospitals must finish their paperwork and administrative work outside normal working hours, which further increases their workload⁽³⁷⁾. Many doctors regarded those non-medical activities less meaningful⁽³⁾. According to our survey over 50% of the respondents were not satisfied with high proportion of time spent on non-medical activities (see Table 1). In the focus group interviews, quite a few doctors reported that they had to make sure the proportion of drug cost for each outpatient and the medical cost for each inpatient not to exceed the limit. Meanwhile, this is included in the performance assessment system, which is closely associated with their salary. The new healthcare reform positioned THCs as part of the public welfare system; consequently, THCs need to provide a comprehensive set of public health services such as health education, family planning and preventive care. Other forms of non-medical activities include attending meetings and preparing for inspections. There is insufficient or even no financial compensation for those non-medical activities, leading to an even lower degree of job satisfaction for rural doctors. Let the professionals focus on their professional work, and spend less time

on filling in forms or preparing for inspections. Only in this way, doctors can have more time managing patients.

Clinical visit number and job satisfaction

Clinical visit number had a complex impact on job satisfaction for rural doctors, with a significant negative impact on CPH doctors rather than THC doctors. Huy et al. (2018) found that the large number of patients received and the insufficient resources of doctors would lead to heavy workload, which led to the imbalance of doctors' "Effort-Reward"⁽³⁸⁾. Some studies have found that the perceived "Effort-Reward" imbalance of medical staff will lead to a decline in their job satisfaction and a strong turnover intention⁽³⁹⁾, and reduce the quality of medical services⁽⁴⁰⁾. The new medical reform removed many barriers to seeking health services for rural patients, leading to a rapid increase in demand for health services. One of the original intentions of the new medical reform is for patients with small illnesses to seek health services from THCs and those with severe illnesses to seek health services from CPHs. However, the capacity of THCs has been impaired by the reform, hindering THCs to provide more medical services. The capacity of THC to provide medical services has been hampered by many factors such as essential drug list, restrictions on surgical qualifications and the egalitarian mentality in the compensation system⁽³⁾. These problems have led to the loss of the backbone of THC, the shrinking of the scope of services and the decline in quality of health services. Doctors in THCs reported that they have seen less patients compared to those of several years ago, though they are equipped with more advanced machinery. "We are better equipped, but cannot retain and recruit talented employees and see less patients." A vice president of a THC in Hebei province said in a focus group interview. Medical service provided by healthcare professionals are regarded as credence goods⁽¹⁷⁾. Low trust from patients lowers the CV further⁽⁴¹⁾. Patients from rural areas rushed into CPHs, leading to the increase of workload of CPH doctors. Seeing more patients and also a high proportion of time spent on non-medical activities cause a less job satisfaction for CPH doctors.

Basic medical services have the characteristics of "quasi public goods"⁽¹⁷⁾, the provision of which cannot solely depend on market mechanism. Therefore, governmental efforts are needed to ensure the public welfare nature of rural health system whilst avoiding the egalitarian mentality in the compensation system. The current compensation and incentive policy is still not in favor of the rural health system, so that rural doctors can't be reasonably compensated for their work^(42, 43). A health system is weak and expensive if it is not primary care-led⁽⁴⁴⁾.

Appendix I shows the OLS regression results, which are consistent with the Order Probit regression results, ensuring the robustness of the results.

Limitation

There are several limitations in this study: a) the three dimensions of workload may not capture all details of workload of rural doctors. b) the sample from three provinces could be insufficient to represent the

national rural doctors. c) there is lack of comparison of the effect of workload on job satisfaction with that of urban counterparts. These problems need to be noted and corrected in future research.

Conclusions

In summary, our findings are in line with previous studies, which all highlight the importance of workload on job satisfaction^(31, 45, 46). In addition, we further analyze the impact of three dimensions of workload on job satisfaction, and discussed the difference of this impact between urban and rural areas. Based on our findings, we found that clinical visit number had a greater impact on the higher-level hospitals (CPHs), while the proportion of non-medical activities had a greater impact on the low-level hospitals (TPHs).

In order to improve the job satisfaction of rural doctors, we should establish a reasonable compensation mechanism, improve the trust of township hospitals, optimize the proportion of non-medical activities, and let doctors do their own professional work. Enhancing the job satisfaction of rural doctors and reducing their workload should be an end rather than a means to achieve better health service. The top priority of hospital administrators shall be increasing employees' enthusiasm for their work, recognizing employees as the linchpin to deliver better health services.

Abbreviations

THCs: Township healthcare centers; CPHs: County public hospitals; WH: Working hours one day on average; CV: Clinical visit number; PT: the proportion of time spent on non-medical activities one day on average.

Declarations

Acknowledgements

None

Authors' contributions

Dong Xiangshu designed the study, conducted statistical analysis, and wrote the first draft. Liu Baodan conducted literature review and refined statistical analysis. Xiaoxiang and Han huawei provide institutional background and policy advice. All authors read and approved the final manuscript.

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Availability of data and materials

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

Ethics approval and consent to participate

Ethical approval for the study on “Equalization of Basic Public Health Services and Incentives for Chinese Rural Doctors” was acquired from National Office for Philosophy and Social Sciences (NOPSS). Consents of participants were obtained before their participations.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Additional File

Additional file 1. OLS regression results

	Model 1	Model 2	Model 3	Model 4
Panel A: overall				
Clinical visit number (reference, moderate)				
Too many	-0.2188 ^{***}			-0.1694 ^{***}
	(-3.83)			(-2.97)
Working hours (reference, ≤8)				
8-10		-0.0495		-0.0258
		(-0.86)		(-0.46)
10-12		-0.1004		-0.0211
		(-1.29)		(-0.28)
≥12		-0.2567 ^{***}		-0.1590 [*]
		(-3.00)		(-1.87)
Proportion of time spent on non-medical activities (reference, moderate)				
Too high			-0.2810 ^{***}	-0.2542 ^{***}
			(-6.32)	(-5.65)
Panel B: CPH doctors				
Clinical visit number (reference, moderate)				
Too many	-0.2616 ^{***}			-0.2312 ^{***}
	(-3.41)			(-2.93)
Working hours (reference, ≤8)				
8-10		0.0157		0.0234
		(0.13)		(0.20)
10-12		-0.0652		0.0059
		(-0.49)		(0.04)
≥12		-0.1742		-0.0866
		(-0.93)		(-0.47)
Proportion of time spent on non-medical activities (reference, moderate)				
Too high				

		-0.1776 ^{**}	-0.1312 [*]
		(-2.33)	(-1.67)
Panel C: THC doctors			
Clinical visit number (reference, moderate)			
Too many		-0.2225 ^{**}	-0.1340
		(-2.41)	(-1.46)
Working hours (reference, ≤8)			
8-10		-0.0996	-0.0737
		(-1.48)	(-1.12)
10-12		-0.1509	-0.0966
		(-1.43)	(-0.93)
≥12		-0.3195 ^{***}	-0.2236 ^{**}
		(-3.27)	(-2.29)
Proportion of time spent on non-medical activities (reference, moderate)			
Too high		-0.3116 ^{***}	-0.2821 ^{***}
		(-5.59)	(-5.00)

Control variables including age, gender, marriage status, educational level, wage (monthly salary), employment status was not reported in the table. Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1